E-Governance

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From the desk of
Dr. T. X. A. ANANTH, BBA, MSW, MBA, MPhil, PhD,
President – University Council

Dear Learner,
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As our Chancellor, Rev.Fr.Dr.J.E.Arulraj , mentioned, it is not just the success for DMI-St. Eugene University alone, it is success for the technology, it is success for the great nation of Zambia and it is success for the continent of Africa.

You can feel the improvement in the quality of the learning materials in the printed format. Improvement is done in quality of the content and the printing. Use it extensively and preserve it for your future references. This will help you to understand the subjects in a better way. The theories of the subjects have been explained thoroughly and the problems have been identified at learners' level. This book is made up of five units and every unit is mapped to the syllabus and discussed in detail.

I am happy at the efforts taken by the University in publishing this book not only in printed format, but also in PDF format in the Internet.
With warm regards

Dr. T. X. A. ANANTH
President – University Council

Chapter I

Objectives

Students should be able to:

- ➢ Define E-Governance
- ➢ State the stages and development of E-Governance
- ➢ Explain the E-Governance Process

Chapter II

Objectives

- ➢ Explain the public and private partnership for E-Governance
- ➢ State the difference between government and governance
- ➢ Explain the government database management.

Chapter III

Objectives

- ➢ Define the term Data Warehouse and explain what is involved in data warehouse.
- ➢ Discuss the government Web Services
- ➢ Explain State Data Center.

Chapter IV

Objectives

- ➢ Explain the digitalization of state and regional administration
- ➢ Discuss the bridging and digital divide

Chapter V

Objectives

- ➢ Define Cyber Law and E-Governance
- ➢ Explain the legal status for Digital Transactions
- ➢ Explain Information Technology.

Chapter I
E-GOVERNANCE

Introduction

Information and Communication Technologies can enhance the transformation of work culture by serving a variety of ends, better delivery of government services to citizens, improved government interactions with business and industry, citizen empowerment through access to information and participation for decision-making and more efficient government management. E-Governance is not meant only for introducing or using technological tools, it fundamentally strives to bring about a change in mindset and work culture to integrate government processes and functions to serve the citizens better. In this process, it is crucial that the capacity of government to be open to criticism as well as the application of new social contract between all stakeholders, confirming a shared responsibility on the transformation processes.

The interaction between a citizen and a government agency takes place in a government office. With emerging Information and Communication technologies it is possible to locate service centers closed to clients. In all the cases public traditionally look for information and services addressing his or her needs and in both cases quality, relevance and efficiency are of paramount importance. Therefore, the establishment of e-Governance requires a good knowledge of the needs that exist in the society and that can be offered using ICT. The effectiveness of ICT in government is closely related with the capacity of government to induce a culture change-placing network within its institutions as instrumental to transparency and knowledge exchange and creation.

Information and Communication Technology (ICT) is one of the most important characteristics of our age and every new development changes our lives to some extent. Its evolution has dramatically changed how citizens interact with their government, creating an important development in their expectations (Dodd, 2000). Following e-commerce's evolution in the private sector, electronic government (e-government) seems to be the next generation of the development in the public sector.

More and more governments around the world are introducing e-government as a means of reducing costs, improving services for citizens and increasing effectiveness and efficiency at national, regional and local levels of the public sector. 179 out of 192 UN members reported that they developed strategies to implement e-government systems and therefore e-government has been identified as one of the top priorities for governments across the world (UN, 2008). The main concepts of e-government will be discussed in following sections.

DEFINITIONS OF E-GOVERNANCE

E-government is also known by different terms such as Electronic Government, Electronic Governance, Digital Government, Online Government, e-Governance etc. (Grönlund, 2004, p. 1). In fact, there are many definitions for the term e-Government and differences reflect the priorities in the government strategies. Fang (2002) defined e-government as a way for governments to use the most innovative information and communication technologies, particularly web-based Internet applications, to provide citizens and businesses with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in democratic institutions and processes (2002, 1).

Moreover, the term "e-government", as used by the OECD E-government Project, applies to the use of ICT as a tool to achieve better government. Therefore, e-Government is not about business as usual, but should instead focus on using ICT to transform the structures, operations and, most importantly, the culture of government.

The OECD report highlights that e-government is an important component in terms of overall reform agendas because it serves as a tool for reform; renews interest in public management reform; highlights internal consistencies; and underscores commitment to good governance objectives (OECD, 2003). World Bank, (2001) define E-government as the government owned or operated systems of information and communication technologies that transform relations with citizens, the private sector and/or other

government agencies so as to promote citizens' empowerment, improve service delivery, strengthen accountability, increase transparency, or improve government efficiency (Ndou, 2004).

E-governance may be defined as delivery of government services and information to the public using electronic means. Such means of delivering information is often referred to as Information Technology or 'IT' in short forms. Use of IT in government facilities is an efficient, speedy and transparent process for disseminating information to the public and other agencies, and for performing government administration activities.

The term governance may be described as the process by which society steers itself. In this process, the interactions among the State, Private Enterprise and Civil Society are being increasingly conditioned and modified through the influence of Information and Communication Technologies (ICTs), constituting the phenomenon of e-Governance.

Examples of these shifts in dynamics are exemplified by:

    i.   The use of the Internet by Civil Society, NGO's and professional associations to mobilize opinion and influence decision-making process that affect them

    ii.   The increasing electronic delivery of government and commercial service and Information

    iii.   The electronic publication of draft legislation and statements of direction for public feedback

    iv.   On the infrastructure side, the liberalization of telecommunication markets and trends towards web-enabled mobile telephony and digital television are facilitating this evolution

CONCEPT & SCOPE

E-Governance is thus a wider concept than e-Government, which is the use of ICT's in the dissemination of services of government. The Commonwealth Network of Information Technology for Development (COMNET-IT), in association with and with the financial support of UNESCO, has developed national profiles detailing current status and developments in this area. Whilst impacts of e-governance in the commercial, NGO and professional areas are

covered in these studies, the main focus centers on specific government initiatives, such as

    i.   The Development of Cyber Laws

    ii.   The Liberalization of Telecommunications

    iii.   Plans for e-Governance

    iv.   Plans for the Development of Community e-Centers

    v.   The Deployment of Community e-Centers vi. Instances of Public Feedback to statements of direction, Draft Legislation and so on

    vi.   Websites of Government Agencies, particularly if these offer value beyond a public relation image

In this process, it is crucial that the capacity of government to be open to criticism as well as the application of a new social contract, between all stakeholders, confirming a shared responsibility on the transformation process. The respect for human rights and freedom of expression is essential to promote and maintain public participation in public consultation spaces. This implies that government's personnel have to learn to network and to place people in the centre of the political process.

So, the effectiveness of ICT in government is closely related with the capacity of governments to induce a culture of change placing networking within its institutions as instrumental to transparency and knowledge exchange and creation. It forces a rethinking of the way hierarchical structures are placed. The transition to a more horizontal government structure, where integration of functions plays a greater role, takes time since the main players need to change attitudes and behavior as they acquire new skills and knowledge that make them confident in the work culture.

According to recent data, there is a close relationship between levels of infrastructure development, education, democratization, political leadership and commitment to the principles of good governance and the level and quality of e-Governance implanted in the countries. These are strong indicators of e-readiness and the opportunity cost of such endeavor. The resulting benefit can be less corruption, increased transparency, greater convenience, efficiency,

revenue growth, and or cost reductions, as well as increased legitimacy.

Use of ICT in Government Organizations

Traditionally, the interaction between a citizen and a government agency takes place in a government office. With emerging information and communication technologies, it is a possible to locate service centers closer to the clients. Such centers may consist of an unattended kiosk in the government agency, a service kiosk located close to the client outside the government agency, or the use of a personal computer at home or office. In all the cases the public traditionally looks for information and services addressing his or her needs and in both cases quality, relevance and efficiency are of paramount importance. Still in some of the conditions, e Governance lags behind in understanding the buyers and sellers needs precisely.

The development of e-Governance includes

i. Publishing

ii. Interaction

iii. Transaction

These activities aim at broadening access to government information such as laws, regulations and data; increasing public participation in decision-making through, for example the publishing of e-mail addresses of government officials and on-line forums, making government services more readily available to the public through e-filing of government documents, online permits.

To date, most effort, in e-Governance, is centered on publishing and not in the subsequent phases of interaction and transaction. Governments, particularly in developing countries face limited resources to move fast in   e-Governance, so a strong partnership between the public, government, business and the civil society is instrumental in determining the expected outcomes and the effectiveness of e-Governance.

The term e-Governance refers to the process of using information technology for automating both the internal operations of the government and its external interactions with citizens and other businesses. Automation of internal operations reduces the cost

and improves their response time while at the same time allowing government processes to be more elaborate in order to increase their effectiveness. Automation of interactions with citizens reduces the overhead for both the government and the citizens, thus creating value for the economy.

E-GOVERNANCE FRAMEWORK

The design and development of such complex solutions poses significant challenges. One such challenge is that in current development environments, the application developers have to work at a low level of abstraction. This means taking care of low-level issues such as intercrosses messaging, tools integration, and data modeling while defining the application logic.

Similarly, solution reconfiguration and management requires the solution administrator to have a detailed understanding of the application logic, making the task time-consuming and error-prone. Handling these challenges effectively requires highly skilled and experienced Information Technology professionals, increasing development costs for effective e-Governance solutions. Solution administrators typically lack these IT skills, rendering change management impossible. In solutions developed to date, each e-Governance solutions has customized existing products to address an individual government agency requirement.

However this might not always be the most economical way to develop a solution. In most industries, around 85 percent of the processes are same across companies within that industry. A similar fraction of the processes can be expected to be similar across different government solutions. Clearly, it is desirable to develop these processes once and then reuse them for many solutions. This is also likely to be true for data models, user interfaces, etc. For example, the address verification process in the driving license renewal solution considered above can be reused while developing a passport renewal solution. Similarly, the traffic violation record verification process can be offered as a service to insurance businesses to be reused in a car insurance solution.

Lack of information (metadata) on available processes and components and difficulty in customizing these for a specific need

currently hinder their reuse for multiple solutions. One can really conclude from the preceding discussion that there is a need for a framework that can simplify the development, deployment, and management of e-Governance solutions.

i. Enabling modeling of a hierarchy of building blocks that can be used to abstract government process to a higher semantic level.

ii. Enabling specification of workflow for government processes independent of standards; the platform takes care of generating the deployable solution that conforms to the appropriate standards.

iii. Enabling reuse of effort across solutions by providing tools to develop generic, parameterized applications or processes that can be stored in a repository with appropriate metadata and effectively reused by various applications with appropriate customization.

iv. Extending programming models to specify the customization points in an application or solution during development, and intuitive interfaces to enable modification of solutions easily after deployment without the need for the business user to modify the application source code

v. Extending programming models to simplify specification of multilingual and multi devices interfaces.

Providing tools to anther the wrappers for the legacy applications and workflows integrating multiple applications to automate processes spanning several government agencies. The current framework prototype described in this chapter will evolve with customer engagements. The approach is to maximize the reuse of available tools and middleware. In the initial stages, the focus of the effort is on the Indian e-Governance market; however, the platform can be extended to suit the needs of other countries as well

EVOLUTION OF E-GOVERNANCE

Global shifts towards increased deployment of IT by governments emerged in the nineties, with the advent of the World

Wide Web (WWW). The technology as well as e-governance initiatives have come a long way since then. With the increase in Internet and mobile connections, the citizens are learning to exploit their new mode of access in wide ranging ways. They have started expecting more and more information and services online form governments and corporate organizations to further their civic, professional and personal lives, thus creating abundant evidences that the new 'e-citizenship' is taking hold.

The concept of e-Governance has its origins in India during the seventies with a focus on development of in-house government applications in the areas of defense, economic monitoring, planning and the deployment of IT to manage data intensive functions related to elections, census, tax administration etc. The efforts of the National Informatics Center (NIC) to connect all the district headquarters during the eighties was a very significant development.

From the early nineties, IT technologies were supplemented by ICT technologies to extend its use for wider sectorial applications with policy emphasis on reaching out to the rural areas and taking in greater inputs from NGO's and private sector as well. There has been increasing involvement of international donor agencies under the framework of e-governance for development to catalyze the development of e-governance laws and technologies in developing countries.

While the emphasis has been primarily on automation and computerization, state governments have also endeavored to use ICT tools into connectivity, networking, setting up systems for processing information and delivering services. At a micro level, this has ranged from IT automation in individual departments, electronic file handling and workflow systems, access to entitlements, public grievance systems, service delivery for high volume routine transactions such as payments of bills, tax dues to meeting poverty, alleviation goals through the promotion of entrepreneurial models and provisions of market information.

The thrust has varied across initiatives, with some focusing on enabling the citizen-state interface for various government services, and others focusing on bettering live hoods. Every state government

has taken the initiatives to form an IT task force to outline IT policy document for the state and the citizen charters have started appearing on government websites. For governments, the more overt motivation to shift from manual processes to IT-enabled processes may increase efficiency in administration and service delivery, but this shift can be conceived as a worthwhile investment with potential for returns.

TYPES OF E-GOVERNMENT

E-government offers services to those within its authority to transact electronically with the government. These services differ according to users' needs, and this diversity has given rise to the development of different type of e-government. E-government functions can be classified into four main categories.

Government-to-citizen (G2C)

The majority of government services come under this application, towards providing citizens and others with comprehensive electronic resources to respond to individuals' routine concerns and government transactions. Government and citizens will continuously communicate when implementing e-government, thus supporting accountability, democracy and improvements to public services.

The primary goal of e-government, is to serve the citizen and facilitate citizen interaction with government by making public information more accessible through the use of websites, as well as reducing the time and cost to conduct a transaction (Ndou, 2004). In applying the idea of G2C, customers have instant and convenient access to government information and services from everywhere anytime, via the use of multiple channels. In addition to making certain transactions, such as certifications, paying governmental fees, and applying for benefits, the ability of G2C initiatives to overcome possible time and geographic barriers may connect citizens who may not otherwise come into contact with one another and may in turn facilitate and increase citizen participation in government (Seifert, 2003).

Government-to-business (G2B)

Government to business, or G2B, is the second major type of e-government category. G2B can bring significant efficiencies to both governments and businesses. G2B include various services exchanged between government and the business sectors, including distribution of policies, memos, rules and regulations. Business services offered include obtaining current business information, new regulations, downloading application forms, lodging taxes , renewing licenses, registering businesses, obtaining permits, and many others.

The services offered through G2B transactions also play a significant role in business development, specifically the development of small and medium enterprises (Pascual, 2003). Fang (2002) argued that G2B applications actively drive e-transaction initiatives such as e-procurement and the development of an electronic marketplace for government purchases; and carry out government procurement tenders through electronic means for exchange of information and goods. This system benefits government from business' online experiences in areas such as e-marketing strategies. The government-to-business G2B is as useful as the G2C system, enhancing the efficiency and quality of communication and transactions with business also, it increase the equality and transparency of government contracting and projects (Moon, 2003).

Government-to-government (G2G)

This refers to the online communications between government organizations, departments and agencies based on a super-government database. Moreover, it refers to the relationship between government and its employees as outlined below. The efficiency and efficacy of processes are enhanced by the use of online communication and cooperation which allows for the sharing of databases and resources and the fusion of skills and capabilities. It renders information regarding compensation and benefit policies, training and learning opportunities, and civil rights laws in a readily accessible manner (Ndou, 2004).

The vital aim of G2G development is to enhance and improve inter-government organizational processes by streamlining cooperation and coordination .On another G2G front, the use of information technologies by different governmental agencies to share or centralize information, or to automate and streamline intergovernmental business processes such as regulatory compliance, has produced numerous instances of time and cost savings and service enhancements (Gregory, 2007).

Government-to-employee (G2E)

Government to employee is the least sector of e-government in much e-government research. Some researchers consider it as an internal part of G2G sector and others deal with it as a separate sector of e-government (Riley, 2001).G2E refers to the relationship between government and its employees only. The purpose of this relationship is to serve employees and offer some online services such as applying online for an annual leave, checking the balance of leave, and reviewing salary payment records, among other things (Seifert, 2003). It is a combination of information and services offered by government institutions to their employees to interact with each other and their management. G2E is a successful way to provide e-learning, bring employees together and to encourage knowledge sharing among them.

It gives employees the possibility of accessing relevant information regarding compensation and benefit policies, training and learning opportunities, and allowing them access to manage their benefits online with an easy and fast communication model. G2E also includes strategic and tactical mechanisms for encouraging the implementation of government goals and programs as well as human resource management, budgeting and dealing with citizens (Ndou, 2004).

STEPS OR PHASES OF E-GOVERNANCE

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

An effort as tremendous as complete realization of e-governance has to be addressed in these phase. This approach would allow for retrospection after each phase, and the ability to retrace steps if required, within a feasible frame of time and money. The design and purpose of each step would have to serve the relevant needs of all G2C, G2B and G2G sectors.

Phase I – Presence

This first phase calls for making the intentions and objectives of the government known. Development of an inclusive government website, or a network of sites dedicated to different ministries and departments would set the stage for further advancements. These sites would convey the government's initiatives, providing information such as official addresses, working hours, as well as forms and applications to the public, economic reviews, corporate regulations for business and budgetary allocations and spending as a reference for government agencies. With this first phase, the very critical task of building the infrastructure, such as telecommunications would be undertaken.

Phase II – Interaction

This phase would allow for basic interaction with the government. Besides hosting search engines on the sites for easy navigation, information detailing social records and job application forms for the public, permit and license documentation for businesses and census details, submission of requests and approvals to the center by local government officers would have to be provided. The task of building the underlying infrastructure would have to be sustained through these two stages, allowing for rapid implementation of advanced applications as endorsed by the consequent phases.

Phase III – Transaction

This phase onwards would signify direct interaction of the government and relevant entities. With the infrastructure in place, complete online service suites can be put forth for the public, businesses and governmental agencies. Services for the public such as bill and fine payments, license renewal, aggregating opinion etc online procurement tax returns etc for businesses, cooperative

budget preparation, tax records, etc for governmental agencies can be envisaged here.

Phase IV – Transformation

This final phase would strive to achieve the true vision of e-Governance.

- ➢ A single point of contact to constituent entities would provide an integrated platform for government services and organization totally transparent to citizens and businesses.

- ➢ Focus on 'virtual agencies' where government information is readily available to all allowing a seamless interface to respective agencies involved in the transactions.

- ➢ State-of-the-art Intranets linking government employees in different agencies extranets allowing seamless flow of information thereby facilitating collaborative decisions among government agencies, NGO's and the public.

The following factors have to be taken into account when examining the risk of implementing e-governance.

- o Political stability: Democracy or dictatorial regime
- o Level of trust in government: perception of service levels
- o The importance of government identity: fragmentation or integration
- o Economic structure: education, agriculture, industry or service
- o Government structure: centralized or decentralized
- o Different levels of maturity: weakest part of the chain determines speed
- o Constituent demand: push or pull

DEVELOPMENT & IMPLEMENTATION OF E-GOVERNANCE

The model presented can serve as a reference for governments to position where projects fit in the overall evolution of their e-Governance implementation. The model can also support governments in defining an e-governance vision and strategy.

A vision is a high-level goal, or ambition level, of government regarding the democracy, government and business aspects of e-governance.

A strategy consists of plans that translate the vision into **SMART** (**S**imple, **M**easurable, **A**ccountable, **R**ealistic &**T**ime-related) projects. A good strategy is crucial to keep the speed in the reform of and implementation process. Thus budgets must be available, time consuming legal transformations should be initiated and quick results must be achieved and communicated to all stakeholders, including the public.

1. Think Big

2. Start Small

3. Scale Fast
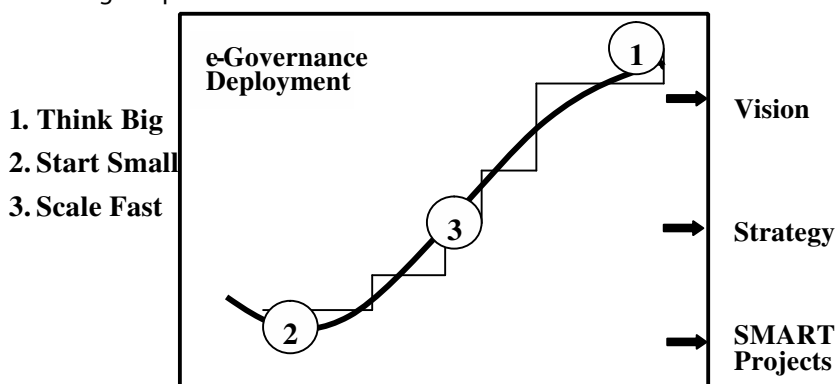
Figure No. 3.1 Implementation Approach

Relative Time

A good approach towards implementation of e-governance is to combine short-term steps (projects) and long-term goals (vision). Projects will have a more structural value for development when embedded in a vision and supported by a strategy. Accentor has defined an approach to implement e-governance projects: 'Thinking big, start small and scale fast'.

The process of going from global objectives to concrete targets is complex. It is a joint effort undertaken by all stakeholders. IICD's core activity is to organize workshops in which this process is facilitated and first steps can be taken.

BENEFITS OF E-GOVERNMENT

The adoption and use of the e-government strategy can provide significant benefits for government in the delivery of more

effective and efficient information and services to all e-government sectors. It enables government agencies to align their efforts as needed to improve service and reduce operating costs (Ndou, 2004). OECD (2006) thoroughly examined e-government initiatives in its members' countries and listed the advantages of e-government as: improving efficiency in processing large quantities of data; improving services through better understanding of users' requirements, thus aiming for seamless online services; helping achieve specific policy outcomes by enabling stakeholders to share information and ideas; assisting government economic policy objectives by promoting productivity gains inherent in ICT and e-commerce; contributing to governments' reform by improving transparency, facilitating information sharing and highlighting internal inconsistencies; and helping build trust between governments and their citizens, an essential factor in good governance by using internet-based strategies to involve citizens in the policy process, illustrating government transparency and accountability. E-government has potential for stronger institutional capacity building, for better service delivery to citizens and business, for reducing corruption by increasing transparency and social control (United Nations Division for Public Economics and Public Administration).

A study by the Intergovernmental Advisory Board (2003) "High Payoff in Electronic Government: Measuring the Return on e-Government Investments" recommends that any successful e-government program should address at least one of the following areas: financial – reduced costs of government operations with enhanced revenue collection; economic development; reduced redundancy - consolidating and integrating government systems; fostering democratic principles; and improved service to citizens and other constituencies. Deloitte Research study (2003) states that the strategic application of IT mainly e-government has the potential to radically reduce the amount of time, money and effort that businesses and citizens must spend to comply with rules and regulations.

It might do so in many ways: providing information in one easy-to-access location; simplifying delivery of services to citizens; improved interactions among government units and with business, industry and citizens; improved productivity (and efficiency) of government agencies; simplifying and streamlining reporting requirements; reducing the number of forms; making it possible for citizens, businesses, other levels of government and government employees to easily find information and get service from the government and government agencies; making transactions (paying fees, obtaining permits) easier; and more effective, cheaper and more convenient delivery of information, knowledge and services. Seifert & Bonham (2003) point out that implementation of e-government not only saves resources, but it can also significantly increase service levels by reducing time spent in bureaucracy.

The desire to provide new and improved services has a tendency to concentrate more on improving the citizen's experience interacting with the government when seeking out information or trying to obtain various services. The evolution of e-government and technology creates the potential for new services to emerge, which contributes to improved service quality.

A key reason for the importance of e-government is the tremendous influence of the Internet as a global networking and communication system. Its rapid spread on a worldwide level (see Figure 1, which illustrates the development of worldwide Internet hosts, namely domain names that are assigned to an IP address) connecting state, economy, society, and citizens also across national borders made it an unprecedented medium. From this point of view, the Internet seems to be an ideal technology to interact and collaborate with all kinds of public stakeholders

In the private sector, for example, it allows companies to develop foreign markets and to conduct international business transactions more efficiently than ever before. However, it also transforms the way how businesses are organized and how they operate, which leads to special needs and requirements that public authorities have to meet from a G2B-perspective. The same holds true from a citizen point of view, because the use of modern

information and communication technologies has changed citizens' demands, too. In light of the enormous importance that the Internet has reached, governments and public authorities therefore, have to account for an adequate adoption and handling of these technologies to meet the respective user needs.

The ongoing technologic development and the constantly increasing degree of globalization, which in combination caused a massive change in business and society, pose severe transformational challenges to governments all over the world. Here, e-government, which is considered a powerful system if applied effectively, may contribute substantially to stepping up to the plate (United Nations 2014) since it is regarded to possess remarkable potential for improving the responsiveness of governments and the public sector to the needs of their stakeholders (Vélez-Rivera et al. 2008). When looking at the influencing conditions that exert pressure on governments from a macroeconomic, business environment perspective, these touch political, economic, social, technological, legal, and environmental factors.

Political pressure arises from the fact that the Internet has massively influenced citizens' behavior as well as their desired information requirements. The resulting information ubiquity dethrones the state—formerly being the largest data collector—from his information monopoly by increasing the number of relevant information providers which leads to a competitive information authority environment (Im et al. 2014).

Since non-state entities already tend to show network structures that empower individuals, favoring these organizations in terms of benefiting from the rapid development of information and communication technologies, in combination with the "non-territorial nature of today's problems and solutions, this strongly suggests that the relative power of states will continue to decline" (Mathews 1997). Thus, public authorities need to effectively deal with this transformational change to stay on top of it and not to lose touch with their citizens by actively and directly interacting with their stakeholders and rethink their role and delivery model within the digital world.

The globalizing world changes the way how individuals and organizations communicate, collaborate, and compete. International cross-border business and available information and communication technologies flatten the world and form new, complex systems of interaction. The resulting knowledge revolution, which is mainly created through interconnected markets and databases as well as a large number of participants that are virtually linked together via information and communication technologies, forces the public sector to revise strategies, management, and operations to respond to increased citizen demands in a more dynamic economic environment (Milakovich 2012).

Moreover, governments and public sector organizations, which tend to show long processing times, lack of flexibility, and a focus on processes instead of results, face general demands of reducing costs and improve operations. The upcoming digital native generation demands better public service provision in terms of convenient access and interaction as well as ongoing personalization and customization possibilities. To relieve these growing pressures, they need to move away from traditional bureaucracy and move on to doing business that centers on the client: citizens as well as governmental and non-governmental organizations. This transition requires an uncomfortable shift, leaving behind long-standing public sector culture and work patterns, towards a novel business model that builds upon an open, transparent, and fast digital interaction between all parties involved (Brown, Thompson, and Fishenden 2014).

Apart from that, complex, interdependent global challenges such as peace, poverty, or inequality, require an increasingly effective collaboration across boarders and across all layers of government as well as with non-governmental stakeholders. Thus, the public sector must provide a well-functioning public administration that delivers the services demanded by citizens and businesses, promotes citizen engagement, participation, and empowerment, and creates an environment that fosters a sustainable social, economic, and environmental future (United Nations 2014).

Companies such as Google, Amazon, or Facebook, which appeared a couple of years ago and have turned many ways of doing business inside out by creating new markets, new opportunities, and entirely new business models, as well as professionally delivering innovation and scalable user-oriented e-services with unprecedented speed. In this context, governments, formerly being among the earliest adopters and largest users of information technologies, could not keep up with the development pace of technology and network organizations since they are partly stuck in complicated and nowadays outdated automation processes (Brown Thompson, and Fishenden 2014), have difficulties to compete with the private sector in the war for talent, and are bound to rigid procurement procedures (Vélez-Rivera et al. 2008).

Although, governments are basically forced to act on the digital advancement of public services, there still persist legal challenges, which complicate a smooth flow of this development, since the online provision of information may violate personal data rights and freedoms (O'Hara 2011), existing inconsistent legal frameworks and copyright obligations hinder data transparency (Goodspeed 2011), and incompatible policy-making may lead to incomplete data provision (Janssen, Charalabidis, and Zuiderwijk 2012).

This situation becomes even more difficult for governmental decision makers since public provision of information always carries an additional risk of breaching confidentiality or security issues. Thus, governments and public authorities need to balance legal restrictions, transparency values, and data privacy (Goodspeed 2011).

Governments are under growing pressure to consider environmental aspects within public policy-making and to elaborate governance measures and mechanisms that foster environmental protection and promote a sustainable management of natural resources. Furthermore, citizens demand an increase in environmental public service provision and an improvement of environmental stewardship. On the whole, the target is to achieve an environmentally sustainable future for next generations (United Nations 2014).

Taking into account this widespread need for action as well as the various levels involved that require improvement, namely " people, process, technology, and governance" (Brown, Thompson, and Fishenden 2014, 4), governments as well as the public sector need to undergo a severe transformation process. This is, where the advancement of time and location-independent information and communication technologies, in the form of e-government, come into play.

E-government promises to provide manifold game-changing advantages. It is supposed to ease access to public sector information and to make interaction with government and public institutions more convenient through online transactions, thus, advancing public administration and transforming public service provision (Garson 2004; Welch, Hinnant, and Moon 2005). Moreover, by shifting the interaction focus from a provider to a user perspective, e-government shall extensively enhance public sector service-orientation (Holzer 2004).

The concept embraces the idea of fostering internal efficiency, effectiveness, and productivity, and thus substantial e-government-related cost savings are expected (Parent, Vandebeek, and Gemino 2005). Increased accountability reflects citizens' demands for transparency and improves control over government bureaucracy (Ahn and Bretschneider 2011). Furthermore, e-government provides a toolset for e-democracy since the concept promotes knowledge sharing, participation, collaboration, and innovation.

In addition, e-government is expected to generate benefits for social inclusion, employment, health, and education, as well as to help governments to promote effective natural resource management (United Nations 2014). Finally, e-government is considered to have the power to renew the image of the government and the public sector (Ahn and Bretschneider 2011; Arellano-Gault 2012) and thus to strengthen citizen trust in the government (Chan et al. 2010; Im et al. 2014).

Thus, e-government is not just about digitizing existing bureaucratic processes. It should rather be seen as a transformation

of e-business models onto the public sector and in terms of how governments operate. This new way of doing business is supposed to allow interactive access 24/7 via one-stop web portals (Garson 2004). These one-stop shop governmental websites are virtual portals that are an integral part of modern public service provision (Liu, Chen, and Wang 2010) and that are organized from a user-oriented perspective, bundling relevant information for citizen-government, business-government, employee-government, or government interaction.

This approach represents a major improvement in the provision of government services, since before, citizens often needed to address various agencies for solving different requests. In a worst-case scenario, they also had to show up in person in every agency, making access to public services a time-consuming activity (Milakovich 2012). In this respect, e-government tries to put people online instead of in line (Schellong 2009).

But despite its extensive expected benefits, e-government is still in an emerging state and its full potential has not been developed yet (Arellano-Gault 2012; United Nations 2014). Apart from that, public sector officials face difficulties that arise from the implementation of new technologies (Arellano-Gault 2012). Furthermore, since the private and the public sector show inherent differences, existing e-business models cannot be simply transferred.

While companies concentrate on their target-customers and the market automatically penalties and rewards actions in the private sector, governments have to serve all people and organizations and deal with coercive actions in accordance with political will-formation within a heterogeneous society (Veit and Huntgeburth 2014). Against this background, e-government has become a major topic of interest to science and public management (Bélanger and Carter 2012).

BARRIERS OF E-GOVERNMENT IMPLEMENTATION

There are several challenges that can delay progress towards realizing the promise of e-government. The variety and complexity of e-government initiatives implies the existence of a

wide range of challenges and barriers to its implementation and management. This section, will briefly introduce the most important and common challenges and barriers as follows.

ICT Infrastructure

The implementation of e-government initiatives face some technological difficulties such as lack of shared standards and compatible infrastructure among departments and agencies. ICT infrastructure is recognised to be one of the main challenges for e-government. Internetworking is required to enable appropriate sharing of information and open up new channels for communication and delivery of new services (Ndou, 2004). For a transition to electronic government, an architecture providing a uniform guiding set of principles, models and standards, is needed. Sharma & Gupta (2003) point out that implementation of the whole e-government framework requires a strong technology infrastructure. In order to deliver e-government services, government must therefore develop an effective telecommunication infrastructure. In addition, they stated that successful e-government implementation would depend upon how the capacities of various infrastructures are structured and how they are capitalized with an integrated focus.

Privacy

Privacy and security are critical obstacles in implementation of e -government in citizen concern (OECD, 2003). Privacy refers to the guarantee of an appropriate level of protection regarding information attributed to an individual (Basu, 2004). Government has an obligation to ensure citizens' rights regarding privacy, processing and collecting personal data for legitimate purposes only (Sharma & Gupta, 2003). Concerns about website tracking, information sharing, and the disclosure or mishandling of private information are universally frequent.

There is also the concern that e-government itself will be used to monitor citizens and invade their privacy. Seifert (2003) emphasised that e-government should be approached with an eye toward the protection of individual privacy. Both technical and policy responses may be required when addressing the privacy issue in an

e-government context. In addition, there is a need to respond effectively to privacy issues in networks in order to increase citizen confidence in the use of e-government services. Citizen confidence in the privacy and careful handling of any personal information shared with governmental organizations is essential to e-government applications. Basu (2004) mentioned that in developing countries, many people are so concerned with privacy and confidentiality issues they decide to forego e-government opportunities. A comprehensive privacy policy should specify citizens' rights to privacy and mandate that personal data be collected and processed only for legitimate purposes (Teeter & Hart, 2003).

Security

Security of an information system means protection of information and systems against accidental or intentional disclosure to unauthorized access, or unauthorized modifications or destruction (Layton, 2007). It refers to protection of the information architecture including network, hardware and software assets and the control of access to the information itself (Basu, 2004). Furthermore, Seifert, (2003) points out that information security, referred to as cyber security or computer security, is an important e-government challenge as it is a vital component in the trust relationship between citizens and government.

Thus, security policies and standards that meet citizen expectations are an important step toward addressing these concerns (Sharma & Gupta, 2003). Security can be classified into two elements: network security and documents security. It should include maintenance and e-infrastructure protection in the form of firewalls and limits on those who have access to data. Furthermore, the use of security technology, including digital signatures and encryption, to protect user IDs, passwords, credit card numbers, bank account numbers, and other such data being transmitted over the Internet and stored electronically is essential to fulfilling security goals in egovernment applications (Feng, 2003). People need to be educated on the importance of security measures, such as private passwords, to ensure their own protection. Cohen & Emicke (2002) point out that

while security will remain an obstacle to e-government, it will not extensively affect its progress as the public learns to work with and accept its occasional lapses. Also, they mentioned three keys that affect the success of security. The first involves continuous improvement and upgrades in an attempt to stay ahead of criminals.

The second is that security be visible and foreboding to deter would be criminals. Finally, it must be accepted that no security system is perfect and that all can eventually be overcome. However, governmental organizations, being responsible for the collection, maintenance, and distribution of sensitive or confidential information, should consider methods of providing security for collected information as well as for their web sites. Thus, a body of security professionals should be setup to respond to threats and breaches. Also the need for authority and an infrastructure encryption system has to be given top-priority (Feng, 2003).

Policy and Regulation Issues

Feng (2003) points out that e-government is not a technical issue, but rather an organizational issue. Implementation of e-government principles and functions requires a range of new rules, policies, laws and governmental changes to address electronic activities including electronic archiving, electronic signatures, transmission of information, data protection, computer crime, intellectual property rights and copyright issues. Dealing with e-government means signing a contract or a digital agreement, which has to be protected and recognized by a formalized law, which protect and secure these kinds of activities or processes. In many countries, e-business and e-government laws are not yet available. Establishing protections and legal reforms will be needed to ensure, among other things, the privacy, security and legal recognition of electronic interactions and electronic signatures (Caldow, 1999).

The effort must incorporate a holistic view, one that is not just focused on technology. Legal reforms and new policy directives may have to be adopted before the online world can function smoothly. Archaic laws, old regulatory regimes, overlapping and conflicting authorities can all greatly complicate or altogether halt a project.

Lack of Qualified Personnel and Training

Another major challenge of an e-government initiative can be the lack of ICT skills. This is a particular problem in developing countries, where the constant lack of qualified staff and inadequate human resources training has been a problem for years (UNPA&ASPA, 2001). The availability of appropriate skills is essential for successful e-government implementation. E-government requires human capacities: technological, commercial and management.

Technical skills for implementation, maintenance, designing and installation of ICT infrastructure, as well as skills for using and managing online processes, functions and customers, are compulsory. To address human capital development issues, knowledge management initiatives are required focusing on staff training in order to create and develop the basic skills for e-government usage. Ongoing access to training is a fundamental prerequisite as the rate of change increases and new technologies, practices and competitive models appear. The full economic benefitsof ICT depends on a process of training and learning skills, this is universal for all governments (OECD, 2003).

Lack Partnership and Collaboration

Collaboration and cooperation at local, regional and national levels, as well as between public and private organizations, are important elements in the e-government development process. However, collaboration and cooperation are not easy factor to achieve. Governments often exhibit considerable resistance to open and transparent systems as they try to preserve their authority, power and hierarchical status (Nodu, 2004). Citizens distrust their governments, especially where there has been a history of dictatorship, political instability or large-scale corruption.

To ensure that the public and stakeholders will be partners in the e-government effort, it is important to try to build trust in government (Carvin, 2004). Collaboration between the private and public sectors is needed too, in order to provide resources, skills and capabilities that the government may lack. A 'new' development model is emerging that focuses on partnership among stakeholders in the knowledge-based development program. Government should

play the role of facilitator and encourage the private sector to participate in e-government development and implementation (Nodu, 2004).

Digital Divide

The ability to use computers and the Internet has become a crucial success factor in e-government implementation, and the lack of such skills may lead to marginalization or even social exclusion (UNPA & ASPA, 2001). The digital divide refers to the gap in opportunity between those who have access to the Internet and those who do not. Those who do not have access to the Internet will be unable to benefit from online services (OECD, 2003). In the case of the digital divide, not all citizens currently have equal access to computers and Internet, whether due to a lack of financial resources, necessary skills, or other reasons. In fact, computer literacy is required for people to be able to take advantage of e-government applications.

Government should train its employees and citizens in basic skills of dealing with the computer and Internet in order to let them participate in e-government development applications. In addition, Smith (2002) points out that making computer available in public locations, such as grocery stores, post offices, libraries, and shopping malls, may help in addressing the gap between those households that have access to the Internet and data services and those who do not. Feng (2003) mentioned that the lack of Internet access among certain sections of the population was considered the most important barrier to e-government development. Indeed, this lack of access among vulnerable or low-income citizens prevents them from being able to make use of those services provided specifically to them. UN (2008) survey found that an increasing in digital divide in developing countries increases the cost of technical barriers in launching and sustaining e-government services.

Culture

Some barriers to the implementation of e-government are not technical, but the cultural implications of new technologies. Personal characteristics and subjective conditions are more likely to be influenced by cultural factors than are the objective conditions

surrounding the development and diffusion of new technology (DeLisi, 1990). Cultural norms and individual behaviour patterns play a role in how citizens and policy makers use technology. Because culture plays a significant role in an individual's outlook, many people resist change and adopt new technologies slowly and with great deliberation (Feng, 2003). Hackney & Jones (2002) identified that improving working relationships between internal departments and external agencies, and adopting a corporate approach as keys to successful e-government. To achieve this, it was felt that major cultural changes are necessary.

Organizational development should be included in the implementation process so that internal cultural changes are accommodated. Chang (2002) states that culture can be determined by several factors: social structure, religion, language, education, economic philosophy and political philosophy. Technical enhancements are not only structural changes, but also cultural changes. These cultural changes, though not as easily tangible, must receive at least as much planning so that technical change is implemented successfully.

Leaders and Management Support

The literature shows that without support from the top management, an innovation is less likely to be adopted. Thus, e-government implementation needs the support from the highest level of government for successful implementation. Top management support refers to the commitment from top management to provide a positive environment that encourages participation in e-government applications. Therefore, it plays a significant role in the adoption and implementation of e-government (Akbulut, 2003).

Leadership involvement and clear lines of accountability for making management improvements are required in order to overcome the natural resistance to organizational change, to gather the resources necessary for improving management, and to build and maintain the organization-wide commitment to new methods of conducting government (McClure, 2001). The involvement of high-level leadership, as well as an integrated vision of IT, is vital to vertical

e-government planning, the acquisition of necessary resources, the motivation of officials, the support of dealings with external partners and stakeholders, to interagency and ministry co-ordination. As can be observed in transitional democracies and developing countries, political leadership and an integrated vision of IT are what drive the development of e-government.

Leaders who perceive a potential gain from the promotion of e-government are more likely to support such initiatives, even in the face of obstacles, while those who believe that they stand to lose from the implementation of e-government cannot be counted on for sustained support (Seifert & Bonham, 2003). Therefore, government needs to educate the upcoming ranks of government leaders, managers and administrators in planning and managing ICTs across all public sectors, focusing on access opportunity, economic development, and effective delivery of public information and services (OECD, 2003).

Chapter II
PUBLIC AND PRIVATE PARTNERSHIP FOR E-GOVERNANCE
Introduction

There is a growing interest in public-private partnerships (PPPs) as a model for e-government service development and delivery. Although various underlying benefits of such arrangement have been enumerated, there exist challenges and issues in PPPs manifest in a number of unsuccessful cases. The success of PPPs in e-government depends on a number of factors that need to be considered from the first stage of evaluating the PPP to the last stage of development and roll-out. However, there is a dearth of PPP studies in the e-government literature that identified the success factors behind these efforts. Hence, this research attempts to address the existing gap by investigating what factors contribute to a successful e-government PPP.

DEFINITION OF PUBLIC PRIVATE PARTNERSHIP IN E-GOVERNMENT
The Concept of PPP

A prerequisite to our discussion involving public-private partnerships is conceptual clarity. The term public, private, and partnership have multiple definitions, individually and jointly. The term partnership may be seen in other similar forms like cooperation (Hodge and Greve 2009), joint venture (Skelcher 2007), interplay (Gómez-Barroso and Feijóo 2010), mix (Wettenhall 2003), strategic alliance (Hancox and Hackney 1999), and collaboration (Donahue 2010). A PPP is defined broadly as an arrangement between a government body and the private sector in which they jointly perform or undertake a public activity. More precisely, this working arrangement is mainly based on mutual commitment (formal contract or informal agreement), and it can be with any organization external to the government sector e.g., a non-profit organization or NGO (Bovaird 2004). A PPP has also been defined as an inter-organizational cooperative venture (Brown et al. 1998) between public and private parties.

Others suggest that in PPPs, it is an on-going agreement between government and private sector in which the private sector

has a role in risk-sharing and the decision-making process (Forrer et al. 2010). Essentially, it involves a long-term cooperation where the partners share risks, resources, goals, and combine the strengths of both sectors (Maskin and Tirole 2008). Therefore, PPP is defined as an arrangement between the public and private sector where both parties work together in pursuit of public goals with the sharing of risks and rewards

A Public-Private Partnership in e-Government may be defined as a legally enforceable contract between a private sector entity and a government body that requires the private partner to deliver a desired electronic public service, for which the private sector must invest some of its own resources (financial, technological, time, corporate reputation, etc.), and must become responsible for some of the risks of service delivery, and for which payments to the private partner are made only in exchange for actual performance delivered.

Generally, the operating risks are allocated to the private sector partner (generally the "commercial" risks) while the "political" risks are allocated to the public sector partner. In practice, there are many kinds of risks that do not fall neatly into the categories of "commercial" or "political", and those risks are allocated between the parties based on negotiations.

The goals of PPPs in E-Government are:

- To mobilize new private sector investment in order to leverage public funds required in the development of e-government networks, including underlying information and communications technology infrastructure and equipment, as well as the public services being delivered on these networks.
- To attract private sector experience, technology, and innovation in the design of electronic networks and services, and to benefit from private sector creativeness and ingenuity; and
- To utilize private sector marketing channels and customer service expertise in the commercial delivery of services to customers of the e-government system.

The potential benefits of PPPs in e-government are:
➢ Increased pace of rolling out e-government services, applications, and infrastructure, due to the financial participation of the private sector through both investment and profit-sharing;
➢ Use of more advanced technologies in the engineering design and availability of more custom tailored engineering systems, made available by the private sector;
➢ Increased focus on outcomes resulting in better quality of service delivery and increased client satisfaction; and
➢ Downstream effects in terms of a more capable domestic private sector

There are a number of PPP models; however, some of the key models in e-government include:
➢ contracting for electronic services and ICT facilities management;
➢ JV co-ownership and financing of projects;
➢ BOT arrangements.

Contracting for Electronic Services and ICT Facilities Management

Contracting or outsourcing involves the provision of services and infrastructure that have previously been provided by government. Contracting enables government to provide the specifications. Service contracts enable government to procure service provisions for a specified period of time. The three popular PPP contracting mechanisms are service, management, and leasing.

JV co-ownership and financing of projects

PPP policies in many countries either require or allow the government to retain some share of the stock in profitable or strategic companies making them, in effect, joint ventures

BOT arrangements

Governments around the world use turnkey projects with consortia of private companies to build ICT, telecommunication, and other large, infrastructure facilities and networks. Governments in both advanced and developing countries often use build-operate-transfer (BOT) agreements, in which they buy or lease completed

facilities constructed by private investors after the companies have recouped their investment and a reasonable return by operating the facilities for an agreed period of time.

SUCCESS FACTORS OF PPPS

As noted in the past literature, the success of a PPP comprises more than agreeing upon an explicit contract and dealing with legal restrictions (Grimsey and Lewis 2002). Additionally, the partnership involves the informal aspects of a relationship such as mutual trust and understanding (Grimsey and Lewis 2002). Furthermore, a partnership can evolve over the course of the arrangement. Thus, across different stages of a PPP, success factors can be different due to the process of changing of objectives and activities. In this section, we first define success and describe the stages of a PPP before discussing the success factors in each stage.

To assess the overall success of a PPP, we can define a project as successful only if related stakeholders are satisfied with the outcomes; in other words, key interests of stakeholders can be attained. For example, suggested the following 6 performance indicators, i.e., 'prompt, stable, and reliable service delivery', reasonable cost of service, meeting output requirements specified in contract, 'fair, open, and transparent procurement procedures', a level playing field in the market, and 'an efficient channel of communication between the community and service provider', for stakeholder satisfaction and success of PPPs. To identify the success factors of a PPP per stage, we divided the PPP process into 3 broad stages i.e., evaluation, establishment, and development, based on past literature.

In the evaluation phase, the government body should consider the benefits of PPPs, and decide on whether the partnership approach should be pursued or not (Jamali 2004; Ng et al. 2010). Decision makers should assess the feasibility of a PPP from the point of view of the government, private sector, and the community.

Therefore, it is suggested that a comprehensive feasibility study that takes public accountability, socio-economic concerns, technical competence, and commercial interests into account can contribute to a successful PPP. The establishment stage involves the

selection of suitable partner(s), and the initiation of a working PPP. The establishment of a PPP may face difficulties as the differences between the public and private sectors can be a potential source of disagreement. Marschollek discusses the divergent institutional logics in PPP and explains that different mindsets, knowledge bases, and organizational structures in the establishment phase can lead to misunderstandings and impose distrust.

Therefore, the author recommends the use of partnership management procedures to reduce knowledge gaps between the parties and to establish/legitimize common routines in this stage of a PPP. The last stage is the development phase in which parties work together to deliver the project. In the development phase, there is a strong need for team building as staff members from different organizations with varying cultures depend on each other to attain the desired project outcomes. Moreover, staff commitment and deploying adequate time and energy can ensure that the objectives and needs of all parties are represented. In addition to stage-based success factors, the literature has suggested a number of PPP success factors that are important in general across all stages. For example, an informal aspect of PPPs is embedded trust that involved parties develop during the partnership. It is argued that trust and mutual understanding are necessary conditions for success throughout a PPP (Jost et al. 2005). The table below summarizes the success factors:

Stage	Success Factors	Citation
Evaluation	⊠Conducting a comprehensive feasibility study (e.g., economic, technical, social evaluation)	(Claps 2012; Jamali 2004; Ng et al. 2010)
Establishment	• Identifying and consolidating of common objectives • Partnership management procedures: otransferring knowledge about the different mindsets, knowledge bases, and	(Jamali 2004; Jost et al. 2005; Marschollek 2011)

	organizational structures oestablishment and legitimization of common routines	
Development	☒Cultivating relationships among project members through team building	(Jost et al. 2005)
All Stages	• Deploying adequate time and manpower • Member commitment	(Jamali 2004; Jost et al. 2005)
	• Openness and fairness • Creating identification	(Jamali 2004; Marschollek 2011)
	• Cultivating mutual trust and understanding among private and public parties • Management of common understanding and expectations	(Jacobson and Choi 2008; Jamali 2004; Jost et al. 2005; Marschollek 2011; Marschollek et al. 2010; Smyth and Edkins. 2007)
	☒Having strong structure at the central administration level	(Jamali 2004)
	☒Having legal and regulatory framework and specific reporting and record keeping	(Jamali 2004)

PPP in E-government

E-government refers to the use of ICT to enhance governance and enable government to offer more convenient

services to citizens, businesses, and employees (Palvia and Sharma 2007). By implementing e-government, public agencies can realize cost reductions and improved efficiency, while citizens, business, and employees receive faster and more convenient services (Gottschalk 2009). However, government bodies face a number of challenges in implementing e-government initiatives such as the shortage of in-house specialists.

Thus, they often opt for joint and contract approaches with private companies for e-government (Brown 2001). Moreover, government agencies facing budget constraints show increased interest towards alternative contracting models such as PPPs (Claps 2012). Beside these constraints, the public sector increasingly faces pressure from the institutional environment e.g., the community and political parties, to adopt egovernment. Thus the level of political support and political engagement can shape a more partnership-intensive approach (Langford and Roy 2006).

Public agencies can benefit in various ways when adopting a PPP arrangement for e-government projects. PPPs can provide opportunities for efficient project management, cost reduction, risk sharing, improvement of service quality, enhanced technological innovation, and combining the strengths of both sectors. In terms of e-government projects, such partnerships can increase the pace of rolling out related services and infrastructure (The Institute for Public-Private Partnership 2009).

In order to gain the benefits of e-government PPPs, it is suggested that governments need to take into account a number of factors (Holden and Fletcher 2005). However, although a few studies have investigated PPPs in the e-government context, a detailed study of success factors of e-government PPPs is still lacking. This is because the main theme of these studies was not about identifying success factors. Also, with the limited empirical research conducted in this area, there is a need to identify and empirically validate the success factors of e-government PPPs.

In addition, there is little understanding of the success factors for particular stages of PPPs with lack of consideration of the dynamics of a PPP over the life of a project. Further, as IS researchers

interested in IT artifacts, we aim to examine the specific success factors of PPPs in e-government in comparison to the general PPP success factors of section

THE MAIN ASPECTS OF PPPs IN e-GOVERNMENT

The Main PPPs in e-Government Models

Types of PPP Contracts				
Type of Contract	**Duration (years)**	**What the private contractors receives**	**Nature of Private contractor Performance**	**Examples**
Service Contract (outsourcing)	1-3	Fee from performing a non-core services	Definitive, often technical type of service	Website design and management, ICT Capacity Building
Management Contract	3-8	Fee from government for the service and a performance-bases incentive	Manage the operation of a government service	Call center staffing; Management and operation of a new records management project
Lease	8 - 15	All revenues, fees or charges from consumers for the provision of the service; the service provider rents the facility from government	Manage, operate, repair, and maintain (and maybe invest in) a service to specified standards and outputs	Equipment and ICT facilities for delivering a new electronic service, Existing Govt. office space, interconnections, kiosks, etc.

BOO & BOT	15 - 25	The government mostly pays the service provider on a unit basis	Design, finance (long-term) construct/install and operate, to specified standards, the facilities necessary for service provision	ICT Infrastructure; e-procurement systems; business portals; Network of public kiosks
Concession	15 - 30	All revenues from the end-users of the e-government service; the service provider may pay a concession fee to the government and may assume existing debt	Manage, operate, as well as invest in and expand, maintain and operate an ICT facility/network ore-government services t specified standards	Telecom operations and expansion, New ICT networks for the delivery of e - government services

Service Contracts or Outsourcing

Service contracts are legally binding agreements between a government authority and a private partner to perform specific, usually non-core tasks. Examples include government agencies such as, utilities, ministries, and municipal offices that contract out for website design and management, capacity building, janitorial services, billing and tariff collection, or security services. These are usually short-term contracts and avail government of private sector expertise. They save time and money spent on non-core services.

Management Contracts

Management contracts transfer responsibility for the operation and maintenance of government owned entities to the private sector. Asset ownership and commercial risk remains with the government, while management control and authority are transferred to a private partner, which applies its expertise to improve management systems and practices. Compensation may be in the form of a fixed fee, as in the case of a fixed fee management contract, or may be linked to performance indicators.

BOT and Variants

Build-operate-transfer (BOT), build-own-operate (BOO), build-own-operate-transfer (BOOT), design-building-finance-operate (DBFO) and similar arrangements are contracts specifically designed for new projects or investments in facilities that require extensive rehabilitation. Under such arrangements, the private partner typically designs, constructs and operates facilities for a limited period from 15 to 30 years, after which all rights or title to the assets are relinquished to the government. Under a build-operate-own (BOO) contract, the assets remain indefinitely with the private partner. The government will typically pay the BOT partner at a price calculated over the life of the contract to cover its construction and operating costs, and provide a reasonable return.

Concessions

Under a concession, the private partner, or" Concessionaire", bears the overall responsibility for the services, including operation, maintenance, and management, as well as capital investments. The fixed assets either remain the property of the public authority or revert to public ownership at the end of the concession period. The main advantage of a concession is that it passes full responsibility for operations, maintenance, rehabilitation, renewal, and service expansion to the private partner and creates incentives for efficiency in all activities. Therefore, concessions are an attractive option where large investments are required.

POTENTIAL APPLICATIONS OF E-GOVERNMENT PPP
National

At the national level, a range of e-government PPPs are possible including national undertaking by national agencies such as the Defense department (IT systems), Internal Revenue Agencies, (e-filing and computerization), Procurement Agencies, (e-Procurement), and the like. It is estimated that governments can save billions of dollars at the national level by outsourcing or divesting certain national agency functions or services to the private sector via PPP's.

Sub-national

At the sub-national level, including state, regional, local, a number of PPP projects are viable in the ICT and e-government field. In fact, many innovative projects have been undertaken at the local level which have "liberated" funding from traditional tax sources and moved the financing of municipal services "off balance sheet" whilst improving efficiency. Examples include local issuance of drivers' licenses and other motor vehicle services, voting, property registration, utility services, emissions controls, education, and parks and recreation. In countries where service delivery is delegated substantially down to the local level, there are literally billions of dollars of potential transactions and cost savings, if the capacity existed, to implement e government and ICT projects effectively.

Key Policy Objectives and Issues in PPP

PPPs can realize these objectives best when they are part of an overall policy framework of reform in the delivery of public services and the management of governmental administrative procedures. Key elements of these policy frameworks should include:

➢ Government ministries that focus on policymaking and planning, but that delegate operational decision-making to public contracting agencies, their Boards and their managers;

➢ Regulation & performance monitoring of these public contracting agencies and any private service providers (PPPs) that is done by an independent regulatory body, or by a dedicated contract compliance office (CCO);

- ➢ Ownership of a sector's underlying, long-term assets by a public contracting agency, utility, parastatal, or asset holding company, which is responsible for service delivery or contracting delivery of these services;
- ➢ Operation of public assets and networks, and the delivery of public services by private contractors through transparent, competitively-procured

The policy objectives of PPPs in e-Government could include:

- ➢ Improved efficiency in the delivery of public services or the performance of public administrative procedures;
- ➢ Expanded access to public services and to public information;
- ➢ Greater transparency & reduced corruption through improved access to public information;
- ➢ Improved quality of service by both measuring and achieving key performance indicators;
- ➢ Reduced costs in the delivery of public services or the execution of public administrative procedures;
- ➢ The transfer of key risks away from the public sector's limited resources and onto the private party that can best manage them;
- ➢ Maximizing Value for Money through reduced costs and lower risks to the public sector;
- ➢ Improved competitiveness of the overall governance and economic framework
- ➢ Improved commercial performance in the delivery of public services and execution of public administration, such as achieving levels of cost-recovery specific performance indicators;
- ➢ Transfer of technology and improved capacity of the public sector to better manage public services and administrative procedures

The Institutional Roles and Responsibilities in PPP Projects

Function of PPP Units While individual operating policies in PPP units varies from country to country, they typically serve to answer three main questions:

- Is the project affordable?
- Is the project a priority for the government?
- How can the project be implemented?

Project Affordability

The PPP Unit, either through its staff or through independent contractors will conduct financial prefeasibility analysis, and financial feasibility studies to determine if the project is economically viable.

Project Prioritization

Once a government department proposes a PPP project, the PPP Unit will liaise with other departments and/or the Ministry of Finance to determine if the project is an overall priority for government. For example, the department of Transportation may see a need for a highway investment project, but the PPP Unit has the responsibility of evaluating that need along with other investment needs in the department of Health or Education. The PPP Unit has the benefit of an "arm's length" perspective.

Project Support

The PPP Unit serves as a center of expertise for all government departments in identifying, structuring, and implementing viable PPP projects, including deal flow, capacity building.

The Major Political Constraints and Challenges to PPP

The following are several of the most common constraints or challenges to PPP.

➢ Perceived Misuse of Taxpayer Money – When a private operator is introduced into public services, there is often the risk that the public will perceive that tax-payer money is transferred to profit driven enterprises.

➢ Private Profits in Exchange for Service Quality – Often the public perception is that the only way the private operator can make a profit in PPP projects is by cutting corners in service quality. Past failures in large-scale PPP infrastructure projects cast a shadow on current PPP initiatives in other sectors.

- Past Failures in Technology Investments – Past public expenditures in technology have not always yielded expected results. In these cases, the public criticizes the waste of money, and become wary of supporting other major investments in ICT or e-government.
- Political Elections Cycle – If PPP projects are proposed and debated during an election year, the changes that a PPP project is likely to bring to the lives of different stakeholder groups might be exaggerated, or downplayed, by political candidates seeking to garner support for their campaign.
- Lack of capacity to develop and manage PPP – It is possible to have political will to support PPP, but no skills in government to further them. In this situation, it is extremely useful to establish a designated PPP Unit within government, and invest in the training of its staff.
- Lack of a Public Spokesperson – e-government PPPs do not have the 'champions' that more traditional PPPs have had. There is not always an easily identified stakeholder group, such as utility customers, doctors, or parents of school children, to work with in the early planning stages of a PPP initiative.
- Lack of local private ICT industry – Many emerging market countries lack private ICT industries that are sufficiently developed to partner with the government on e-government PPP projects.

The Financial Challenges and Constraints in PPP Projects

PPP financing are the combination of public finance, corporate finance; and project finance.

Public Finance

Characterized by a direct lending to the project, or by a government guarantee provided to the private sector lenders, or a combination of the two.

Corporate Finance

It involves providing the lender(s) with recourse to the Borrower's, or if the Borrower is a new Special Purpose Vehicle (SPV) company that has been established to become the operator then,

both the Borrower's and the Borrower's Parent Company's, assets to secure loan repayment

Project Finance

It can be either "non-recourse" or "limited recourse" financing, which means the lender's access to the assets and revenue streams of the borrower and/or its parent company is entirely or partially limited. Funds to repay the loan are supposed to come entirely or partially from the project.

Payment Mechanisms

There are a wide variety of payment mechanisms in PPP Project Finance. Loans can be either senior debt, in which the loan payments must be made regardless of the financial performance of the project, or they can be subordinated debt, in which case, the loan payments have to be made to the extent that the project earnings and profits are realized.

Incentives for Investors

Traditionally, governments have offered "investment incentive" schemes that focused on tax holidays, tax exemptions, labour training grants, import duties exemptions, subsidized land and/or buildings provision.

PPP Funding Facilities

It can be in the form of a project development facility (PDF), which is a pool of money, usually donor grant funded with possibly some contribution from the government. Otherwise it can be PPP project finance facility (PFF).

The Major Risks in PPP Projects and How are they Managed

Risk Sharing

The price and quantity of services that are projected over the concession period are essential inputs to the financial projections are good starting point for this analysis.

Price:

Determined by market conditions but governments can offer the private partner some kind of monopoly over the provided services in order to recover the investment.

Quantity

Quantity is estimated by demand projections and as such it represents a commercial risk for the private partner. However, the public partner do not have to adversely impacts the quantity of demand

Categories of Risks

➢ Construction Period Risk is allocated to the private party, which is usually required to provide a bond to ensure that, if it experiences delays and/or cost overruns in construction beyond a certain point, then the government can liquidate the bond to cover its costs associated with such delays and/or cost overruns.

➢ Operations and Maintenance (O&M) Risk. The private partner must conduct a sufficient O&M to enable the facilities to deliver the required levels of quantity and quality of service.

➢ Quality of service risk is covered to some degree by O&M requirements, to the extent that quality of service is dependent on the quality of the facilities. But in PPP projects, it is essential to keep the focus on the outputs. How the Concessionaire delivers the outputs is its responsibility? Output Specifications are a key component to any PPP Project

Roles and Responsibilities

The roles and responsibilities of the parties to a PPP contract are:

➢ Bidder – this is the private legal entity or consortium that submitted a bid and was awarded the concession;

➢ Contracting Authority (CA) – this is the government body that has the legal authority to execute the concession agreement on behalf of the government;

➢ Executing Agency (EA) – this is the government body that is tasked with performing all of the obligations of the government under the Agreement;

➢ Regulator – there always has to be a regulator that will oversee the contract and protect the interests of all parties to the contract as well as consumers; and

> Third Parties – if any third parties are bound by any provisions of the contract then those parties should execute the agreement. Care must be taken in confirming that the contracting authority may legally bind other government agencies that might be involved in the contract and service provision. This is a weak area in many PPP Contracts, for example a ministry of public works agrees to acquire all land necessary for the project, but in practice the funds for such purchases have to come from the ministry of finance. If the ministry of finance is not going to be a signatory to the agreement, then the contracting agency should be required to produce a letter of commitment from the ministry of finance for the land purchases.

Key Issues and Challenges

> Because PPP projects are essentially business joint ventures, and government officials are more familiar with traditional procurement than with business, it can be difficult for the government to assemble a contract negotiations team that will be able to handle the virtual "army" of lawyers, accountants, and highly skilled negotiators that the private sector will mobilize for large projects. This creates a necessity for extensive consultant assistance to protect the government's interests.

> To protect the public interest, ownership of the "backbone" or "basic assets" or "platform" is often kept with the government, such as telecoms fiber optic backbone, airport runways and taxiways, and internet-based platform for e-gov. Although the focus of PPP is on service delivery and not ownership, the government might want to retain ownership, or have a transfer of ownership at the end of the concession period, to protect the public interest.

> Tariff regulation is a recurring area of complexity in PPP projects. The mandate of the government is to protect the consumer, but this may be in conflict with the private sector operator's need who wants to have prices to fluctuate and

respond in accordance with market forces. This dichotomy makes the presence of a politically and financially independent regulator particularly important in PPP projects. Unless tariff regulation is conducted by an independent regulator, future disputes between the parties regarding tariffs and tariff adjustments are likely to occur.

➢ Subsidies are an area of concern in PPP projects. The government's mandate is to protect the consumer by ensuring the availability of "basic services" for low-income groups, and this mandate conflicts with the PPP project's goal of profitability. Subsidies are required when the government requires the operator to provide such services to low-income groups, like railway passenger traffic. Yet governments often find that they are unable to make such subsidy payments and then disputes arise.

➢ There is a continuing issue of response time in PPP projects. While the private operator can respond quickly to changes, the government is usually less able to be responsive in a timely manner. Because of this, disputes often arise in PPP projects over a government delay in making a tariff adjustment or in issuing a permit, while the market forces necessitating such acts have already occurred.

THE DIFFERENCE BETWEEN GOVERNMENT AND GOVERNANCE
Government vs governance

Government and governance are two words that sound similar but are different in meaning. Difference between government and governance is confusing for many people, and this article intends to clarify the meaning and definition of the two words so as to leave no scope for confusion. An analogy can be drawn between officer and official and also bureaucrat and bureaucracy if we wish to understand difference between government and governance.

Government

This is a body that comprises a person or a group of persons who run the administration of a country. This is a means in which power is exercised. There are various forms of governments such as democracy or autocracy but this article will remain confined to the

general term government which is commonly used in social sciences. In normal circumstances, a state is run by a government that has a mandate from the people to run the affairs of the country and also a term that may be of 4-6 years to serve the state. Thus there is a succession of governments in any country or the same government may be elected again for a successive term if people feel that it has done its job of running the country in a fair and close to ideal manner.

Government is a group of people who rule or run the administration of a country. In other words, it may be said that a government is the body of representatives that governs and controls the state at a given time. Government is the medium through which the power of the state is employed.

Government may be of different types. It may be a democracy or autocracy, but most of the modern governments are democratic. Here we are taking into consideration the democratic ones in relation with the government. A democratic government may be defined as that which has the public mandate to run the affairs of the country with a well-defined term after which in the successive term the same people may be elected again. The government may be labeled as good or bad according to their ways of working for the good of the people. If a government provides capable governance, then it has a chance of coming back into power again

Governance

The word governance refers to the activities of a government. In layman's terms, it is the rules and laws made by the government that are sought to be implemented through a chosen bureaucracy which is referred to as governance. The process of governing people or a state is called governance.

Governance is the act of governing or ruling. It is the set of rules and laws framed by the government that are to be implemented through the representatives of the state. Simply put, governance is what governments do. Governance is a concept that can be followed in an organization of any size, be it a single cell or an organism or all of humanity. Governance may function variously for

profit or nonprofit, for people, or itself. The main purpose of governance is to assure good results following a set pattern of rules. Governance may be of various types:

- ➢ Global Governance
- ➢ Corporate Governance
- ➢ Project
- ➢ Information Technology
- ➢ Participatory
- ➢ Non-Profit and a few others

Difference between government and governance

To understand the differences between government and governance, one can take the example of a business which is handled by a person or group of persons (called partners or owners). The way they run the business with the help of employees applying their knowledge and experience is called management. In a similar manner, government is the elected body of representatives headed by a person. This body has the mandate to rule or govern people. And the manner in which they use the established system and principles to run the affairs of the country is called governance.

Governance can be good or bad depending upon the perception of the people and they may accordingly choose to retain or vote a particular government out of power.

The difference between "government" and "governance" may be clarified using an example of a business which is run by a group of people. The rules and regulations which they follow in order to run the business successfully are called the management. This involves the experience and the knowledge of the owners working together with the employees to meet the set target. On a similar pattern, the government is a body of elected representatives which is headed by a single person. This body makes use of established rules and a principle to efficiently run the affairs of the country in favor of the people of the nation is called governance

E- GOVERNMENT AND E- GOVERNANCE

E- Government

E-government is, above all, a process of change in the way government shares information and delivers services to achieve greater transparency and convenience in transacting with citizens and businesses. E-government refers to the use of information and communications technologies (ICT) to improve the efficiency, effectiveness, transparency and accountability of government. E-government is the use of information and communications technologies (ICT) to transform government by making it more accessible, effective and accountable.

E-government includes:

- providing greater access to government information;
- promoting civic engagement by enabling the public to interact with government officials;
- making government more accountable by making its operations more transparent and thus reducing the opportunities for corruption; and
- providing development opportunities, especially benefiting rural and traditionally underserved communities.

E-Governance

While E-governance is generally considered as a wider concept than e-government, since it can bring about a change in the way citizens relate to governments and to each other. E-governance may be defined as delivery of government services and information to the public using electronic means. Such means of delivering information is often referred to as Information Technology or 'IT' in short forms. Use of IT in government facilities is an efficient, speedy and transparent process for disseminating information to the public and other agencies, and for performing government administration activities.

The term governance may be described as the process by which society steers itself. In this process, the interactions among the State, Private Enterprise and Civil Society are being increasingly conditioned and modified through the influence of Information and

Communication Technologies (ICTs), constituting the phenomenon of e-Governance.

GOVERNMENT DATABASE MANAGEMENT

What is a database and database management system?

A database is a collection of information that is organized so that it can be easily accessed, managed and updated.Data is organized into rows, columns and tables, and it is indexed to make it easier to find relevant information. Data gets updated, expanded and deleted as new information is added. Databases process workloads to create and update themselves, querying the data they contain and running applications against it.

A **government database** collects information for various reasons, including climate monitoring, securities law compliance, geological surveys, patent applications and grants, surveillance, national security, border control, law enforcement, public health, voter registration, vehicle registration, social security, and statistics.

A **database** is an organized collection of data. A relational database, more restrictively, is a collection of schemas, tables, queries, reports, views, and other elements. Database designers typically organize the data to model aspects of reality in a way that supports processes requiring information, such as (for example) modelling the availability of rooms in hotels in a way that supports finding a hotel with vacancies.

A **database-management system** (**DBMS**) is a computer-software application that interacts with end-users, other applications, and the database itself to capture and analyze data. A general-purpose DBMS allows the definition, creation, querying, update, and administration of databases.

What is Data Management?

Data Management is a group of activities relating to the planning, development, implementation and administration of systems for the acquisition, storage, security, retrieval, dissemination, archiving and disposal of data. Such systems are commonly digital, but the term equally applies to paper-based systems where the term records management is commonly used. The term embraces all

forms of data, whether these datasets are simple paper forms, the contents of relational databases, multi-media datasets such as images, or scientific data.

The management of geographic data is in many ways no different to the management of other types of data. However, it is important to recognize that there may be geography-specific issues that need careful thought as part of Data Management activities; for example, ensuring that any geographic identifiers used are appropriate and resilient. Bearing in mind that one of the strengths of geographic data is the ability to link seemingly disparate pieces of information, it is absolutely critical to ensure that the chosen geographic identifiers allow this.

Key Data Management activities include:

- Data Policy development;
- Data Ownership;
- Metadata Compilation;
- Data Lifecycle Control;
- Data Quality; and
- Data Access and Dissemination.

Why do we need to manage our data?

Government owns huge amounts of irreplaceable Geographic Information, potentially of use to a wide range of bodies, and there are increasing pressures on departments/agencies to manage these data properly.

Key drivers for improved Data Management

- Increasing recognition that Government data, collected at public expense, must be properly managed in order to realize their full potential and justify their considerable production and maintenance costs.
- Increasing pressure from customers for easier and quicker access to the right information at little or no charge.
- Interoperability between systems and services, for so long seen as desirable, is now becoming a reality. The outputs and credibility of such services depend heavily upon the quality of the data provided. As the number of interoperable

services increases, so too does the requirement to have ready access to data of known (maintained) quality.

- Stronger emphasis within Government on the need to rationalize and combine data in order to improve efficiency and add value.
- More reluctance from suppliers to provide data at affordable prices. Stricter control is required by Data Owners over the use of their data to safeguard their Intellectual Property Rights (IPR) and the confidentiality of sensitive data.

Benefits of Good Data Management

Data Management policies and procedures ensure that data on all media are treated as a valued resource. Databases are used to support internal operations of organizations and to underpin online interactions with customers and suppliers. Databases are used to hold administrative information and more specialized data, such as engineering data or economic models. Examples of database applications include computerized library systems, flight reservation systems, computerized parts inventory systems, and many content management systems that store websites as collections of webpages in a database

Implementing such policies and procedures will give many benefits:

Benefits to Data Suppliers

- An increased confidence and trust that their data will be used according to their agreed conditions of use, without risk to confidentiality, copyright or IPR, and in compliance with all statutory and non-statutory obligations.
- Providing a clear understanding of the use of their data, formally documented in a Memorandum of Agreement signed by both supplier and user.
- A fair return for the use of the data they have supplied.

Benefits to Data Brokers/Intermediaries

➢ Better quality, harmonized and coherent data from the use of common definitions, including geographic references, formats, validation processes and standard procedures.

➢ Better care of the data holdings through the use of effective data policies and best practice guidance.
➢ Better control over the data by the clear definition and use of the procedures for the care of data.
➢ Improved knowledge and understanding of data holdings, their availability, interpretation and use, with subsequent reduction of the risk of duplication or loss, through better cataloguing, metadata and, in time, better access to data via an integrated data environment.
➢ Improved business processes, including better and more efficient use and re-use of data, and the standardization of datasets that are frequently used by different parts of an organization.
➢ Increased confidence that the organization complies with statutory and non-statutory obligations, by the regular use of centrally coordinated, frequently updated guidance, codes of practice and training on legal, contractual and other obligations.
➢ Better control over access to data, both for internal and bona fide external customers, resulting from better data organization and maintenance following defined policies on release, disclosure control and data security.
➢ More sensible and consistent data charges and conditions of use, resulting from clear pricing and dissemination policies that recognize the need for free access by appropriate customers whilst recovering the appropriate income from customers who seek to make commercial gain.
➢ An increasing confidence by the customer in the quality of the data managed and in the reliability of outputs that are produced.

Benefits to users and customers

- Improved awareness and understanding of what data are available for current and future use, resulting from better cataloguing and data archiving.

- Improved access to data, free from unnecessary obstacles, safeguarded from disclosure of personal information or infringement of legal and contractual obligations.
- Better quality and more timely information i.e. access to the right information at the right time, resulting from quicker identification of customer needs and the avoidance of wrong or conflicting information, through the use of effective metadata.
- Better value for money, resulting from clear, fair and consistent data charges and conditions of use, which recognize the need for free access by the appropriate customers.
- Better exploitation of data generally, enabled by easier data exchange and integration with other harmonized data.
- Efficiency gains across government and its agencies resulting from the use of better quality data.

PRINCIPLES OF GOOD DATA MANAGEMENT

Good Data Management is essential for the effective use of the information resources of public bodies in all their forms.

Avoid re-collecting data

The largest potential for waste in Data Management is reacquiring an existing dataset. This has been done frequently by public and private sector organizations and must be avoided. In the USA, Executive Order 1290612 requires government agencies to put internal procedures in place to ensure that they check whether other agencies have already collected information they plan to acquire. Whereas no equivalent instruction exists in the UK, it should be regarded as best practice to use the gigateway Data Locator to search for existing geospatial datasets before new ones are created.

Data lifecycle control

Good Data Management requires that the whole life cycle of datasets be managed carefully. This includes:

- Business justification, to ensure that thought has been given to why new data are required rather than existing data amended or used in new ways, how data can be

specified for maximum use including the potential to meet other possible requirements, and why the costs of handling, storing and maintaining these data are acceptable and recoverable.

- Data specification and modelling, processing, database maintenance and security, to ensure that data will be fit for purpose and held securely in their own databases.
- Ongoing data audit, to monitor the use and continued effectiveness of the data.
- Archiving and final destruction, to ensure that data are archived and maintained effectively until they are no longer needed or are uneconomical to retain.

Data policy

The fundamental step for any organization wishing to implement good Data Management procedures is to define a Data Policy. The document may have different names in different public bodies but in each it should be a set of broad, high-level principles that form the guiding framework within which Data Management can operate. This is the document that is approved at senior levels in the public body, and the senior executive who owns the policy (Data Management Champion) manages the resources for its implementation. Section 6 includes a model Data Policy Statement.

Data ownership

One key aspect of good Data Management is the clear identification of the owner of the data. Normally this is the organization or group of organizations that originally commissioned the data acquisition or compilation and retains managerial and financial control of the data. The Data Owner has legal rights over the dataset, the IPR and the Copyright.

Data ownership implies the right to exploit the data, and if continued maintenance becomes unnecessary or uneconomical, the right to destroy them, subject to the provisions of the Public Records and Freedom of Information acts. Ownership can relate to a data item, a dataset or a value-added dataset. IPR can be owned at different levels. For example, a merged or value-added dataset can be owned by one organization, even though other organizations

own the constituent data. If the legal ownership is unclear, there are risks that the data can be wrongly exploited, used without payment of royalty to the owner, neglected or lost.

It is therefore important for Data Owners to take action to establish and document:

- The ownership, IPR and Copyright of their data so that these can be safeguarded.
- The statutory and non-statutory obligations relevant to their business to ensure that the data are compliant.
- The departmental policies for data security, disclosure control, release, pricing and dissemination.
- The agreement reached with users and customers on the conditions of use in a signed Memorandum of Agreement, before data are released.

Metadata

All datasets must have appropriate metadata compiled for them. At the simplest level metadata are "data about data". Metadata provide a summary of the characteristics of a dataset. A good metadata record enables the user of a dataset or other information resource to understand the content of what they are reviewing, its potential value and its limitations.

There are many metadata standards, but the ones that are most appropriate to GI are:

- ISO 19115:200314 (Geographic Information – Metadata); and
- UK GEMINI – (Geo-spatial Metadata Interoperability Initiative) The profile is the result of a collaboration between the AGI15 and the e-Government. A profile is a subset of one or several information standards that adopts elements, structures or rules for different user communities. Adherence to the UK GEMINI profile, which will replace the gigateway Discovery Metadata Specifications (the NGDF Standard) as the UK's national geospatial metadata profile, allows for the creation of discovery metadata with both ISO 19115 (Geographic Information – Metadata) and the

national e-Government Metadata Standard (eGMS), ensuring compliance with both.

- Comprehensive advice on the compilation of metadata can be found in the IGGI booklet entitled "The Principles of Good Metadata Management", the second edition of which was published in May 2004.

Data Quality

Good Data Management also ensures that datasets are capable of meeting current needs successfully and are suitable for further exploitation. The ability to integrate data with other datasets is likely to add value, encourage ongoing use of the data and recover the costs of collecting the data. The creation, maintenance and development of quality data require a clear and well-specified management regime.

Data Steward

All datasets need to be managed by a named individual referred to here as the Data Steward; also known as dataset manager and data custodian. A Data Steward should be given formal responsibility for the stewardship of each major dataset. They should be accountable for the management and care of the data holdings assigned to them, in line with the defined data policy. Section 6 provides a list of the responsibilities of the Data Steward.

Data Management Plan

The Data Steward is responsible for the development of a Data Management Plan for each dataset under their responsibility. The objective of the Data Management Plan is to ensure:

- That the dataset is fit for the purpose for which it is required.
- That the long-term management of the dataset is considered for potential re-use.

The individual management plans should be compliant with the local data policy and include:

- Scope of the plan
- Link to metadata
- Responsibilities
- IPR and Copyright

- Quality objectives
- Standards (International, National and local) adopted during compilation of the data
- Staff resources required to manage the dataset
- Physical resources required to manage the dataset
- Long term management of the dataset

Data Management procedures

Individual datasets may require compilation of specific Data Management procedures. These may be needed where specific datasets require detailed operational procedures to ensure their quality; examples of this include scientific and statistical datasets.

Data access and dissemination

Although this aspect will depend upon the business and the financial policy of the organization, the following guidance should be followed.

- Public access to data should be provided in line with The Freedom of Information Act, The Data Protection Act and The Human Rights Act.
- IPR and Copyright of datasets owned by public bodies must be protected, as data should be regarded as an asset.
- IPR and Copyright of third-party data must be respected.
- The potential for commercial re-use and exploitation of the dataset should be considered.
- The right to use or provide access to data can be passed to a third party, subject to agreed pricing and dissemination policies.
- Consideration should be given to the impact of European developments such as the Public Sector Information Directive and INSPIRE.

Data audit

Data Management audits are recommended to ensure that the management environment for given datasets are being maintained. Their purpose is to provide assurance to the Data Management Champion that the resources expended are being used appropriately. Audits of major datasets should be commissioned to

ascertain the level of compliance with data policies and the Data Management plans and procedures that have been prepared.

KEY REQUIREMENTS OF GOVERNMENT DATABASE MANAGAMENT

Government organizations need to create and make available reliable, accurate, timely, and comprehensive master data across a wide variety of agencies, programs, individuals, and employees. Master data management projects in the public sector have specific requirements and involve the following nine steps.

Step 1: Access

Silos of data are everywhere—in applications and systems at the program, department, and agency levels. Government organizations need to be able to access all data, regardless of its source, type, or format to get a complete 360-degree view of master data.

Step 2: Discover

Data quality is essential to good decision making. Government agencies need to profile the quality and structure of their data to uncover the duplications, errors, and inconsistencies that can lead to lead to security issues, high error rates in government programs, and improper payments.

Step 3: Model

Government data can be big and complex. From intelligence and homeland security to human services, the requirements for data capture, storage, transformation, aggregation, and analysis are extensive. Government agencies need a dynamic data model to define the huge volume and variety of master data and manage its complexity.

Step 4: Cleanse

Government organizations need to resolve errors and inconsistencies in master data. Accurate, timely, and complete data results in better eligibility determinations, fewer improper payments, and a more comprehensive view of program participation. A complete understanding of all of relevant activities and associations

is also critical for security and public safety initiatives. Simply put, better data leads to better decisions and better outcomes.

Step 5: Recognize

Improper payments and high error rates in social services and other benefit programs continue to plague federal and state governments. Agencies need to be able to rapidly match and accurately identify duplicate master data. By eliminating potential duplicate transactions, government organizations can reduce error rates and improper payments, and detect and eradicate fraudulent claims.

Step 6: Resolve

Once duplicates have been identified, they must be merged to create a trusted, single version of the truth—a golden record. By aggregating data into a golden record, government organizations are able to identify risk areas, identify potential errors or fraud, make better and more informed decisions, and provide accurate and timely reporting.

Step 7: Relate

Understanding relationships and affiliations among citizens, constituents, and groups is essential to government agencies' ability to provide security, safety, and effective social service programs. Government agencies need to be able group contacts into households and organize complicated relationship information into hierarchies to be able to determine program participation, make timely decisions, and set effective policies.

Step 8: Govern

Government organizations need a way to create, consume, manage, and monitor master data, as well as maintain full and accurate records and keep those records confidential, secure, and accurate. Data governance is an organizational strategy and methodology for documenting and implementing business rules and controls about valuable data.

Step 9: Deliver

Trusted master data must then be delivered to and synchronized with downstream applications and data warehouses. With accurate, timely, and aggregated data available to program

owners, policy makers, and data analysts and scientists, government organizations gain a comprehensive and trusted view into total costs, program effectiveness, and outcomes measurement.

DATA WAREHOUSE

Data warehouse is a database of unique data structure that allows relativity quick and easy performance of complex quires over large amount of data. A classical production information system is preliminarily adapted to input data. It allows the company to be operational and run smoothly and that means mostly data entity stored data in the production system require the data to be administered on those data should be able to extract useful information from large amount of data.

The administrative structure of the company should be able to extract useful information from the large amount of the data, which will be used as planning and decision making for the stored data. The mode provided by the data warehouse is faster & easier access to information to view and analyze large amounts of data in which time measures the reach in seconds or minutes.

Data Warehousing is subject-oriented, integrated, time variant, and non-volatile collection of data in support of management's decision-making process.

- A data warehouse is data management and data analysis
- Data Web house is a distributed data warehouse that is implemented over the web with no central data repository
- Goal: is to integrate enterprise wide corporate data into a single repository from which users can easily run queries

Characteristics of a warehouse

➢ It is integrated.
➢ Subject oriented.
➢ It is time variant.
➢ It is non-volatile

Integrated:

The data warehouse is a centralized, consolidated database that integrates data derived from the entire organization

➢ Multiple Sources
➢ Diverse Sources
➢ Diverse Formats

The data warehouse integrates corporate application-oriented data from different source systems, which often includes data that is inconsistent. „ The integrated data source must be made consistent to present a unified view of the data to the users.

Subject-Oriented:

Data is arranged and optimized to provide answer to questions from diverse functional areas. –Data is organized and summarized by topic. subject-oriented „ The warehouse is organized around the major subjects of the enterprise (e.g. customers, products, and sales) rather than the major application areas (e.g. customer invoicing, stock control, and product sales). This is reflected in the need to store decision support data rather than application-oriented data.

Time-Variant:

The Data Warehouse represents the flow of data through time and Can contain projected data from statistical models. Data is periodically uploaded then time dependent data is recomputed. Data in the warehouse is only accurate and valid at some point in time or over some time interval. „ Time-variance is also shown in the extended time that the data is held, the implicit or explicit association of time with all data, and the fact that the data represents a series of snapshots.

Non- volatile:

Once data is entered it is NEVER removed. Represents the company's entire history –Near term history is continually added to it – Always growing – Must support terabyte databases and multiprocessors, Read-Only database for data analysis and query processing. Data in the warehouse is not updated in real-time but is refreshed from operational systems on a regular basis. „ New data is always added as a supplement to the database, rather than a replacement.

In computing, a **data warehouse** (**DW** or **DWH**), also known as an **enterprise data warehouse** (**EDW**), is a system used for reporting and data analysis, and is considered a core component of business intelligence. DWs are central repositories of integrated data from one or more disparate sources. They store current and

historical data in one single place that are used for creating analytical reports for workers throughout the enterprise.

The data stored in the warehouse is uploaded from the operational systems (such as marketing or sales). The data may pass through an operational data store and may require data cleansingfor additional operations to ensure quality before it is used in the DW for reporting.

The typical Extract, transform, load (ETL)-based data warehouse uses staging, data integration, and access layers to house its key functions. The staging layer or staging database stores raw data extracted from each of the disparate source data systems. The integration layer integrates the disparate data sets by transforming the data from the staging layer often storing this transformed data in an operational data store (ODS) database.

The integrated data are then moved to yet another database, often called the data warehouse database, where the data is arranged into hierarchical groups, often called dimensions, and into facts and aggregate facts. The combination of facts and dimensions is sometimes called a star schema. The access layer helps users retrieve data.

The main source of the data is cleansed, transformed, catalogued and made available for use by managers and other business professionals for data mining, online analytical processing, market research and decision support. However, the means to retrieve and analyze data, to extract, transform, and load data, and to manage the data dictionary are also considered essential components of a data warehousing system. Many references to data warehousing use this broader context. Thus, 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.

The Main Components of the warehouse.

➢ **Operational data sources**- for the DW is supplied from mainframe operational data held in first generation hierarchical and network databases, departmental data held in proprietary file systems, private data held on workstations

and private servers and external systems such as the Internet, commercially available DB, or DB associated with and organization's suppliers or customers.

➢ **Operational data store(ODS)-**is a repository of current and integrated operational data used for analysis. It is often structured and supplied with data in the same way as the data warehouse, but may in fact simply act as a staging area for data to be moved into the warehouse.

➢ **Load Manager-** also called the frontend component, it performs with all the operations associated with the extraction and loading of data into the warehouse. These operations include simple transformations of the data to prepare the data for entry into the warehouse.

➢ **Warehouse Manager**- performs all the operations associated with the management of the data in the warehouse. The operations performed by this component include analysis of data to ensure consistency, transformation and merging of source data, creation of indexes and views, generation of denormalizations and aggregations, and archiving and backing-up data

➢ •**Query Manager-** also called backend component; it performs all the operations associated with the management of user queries. The operations performed by this component include directing queries to the appropriate tables and scheduling the execution of queries.

➢ **Detailed, lightly and highly summarized data, archive / backup data.**

➢ **Meta-Data.**

➢ **End-user access tools**- can be categorized into five main groups: data reporting and query tools, application development tools, executive information system (EIS) tools, online analytical processing (OLAP) tools, and data mining tools.

DATA FLOWS

- **Inflow-** The processes associated with the extraction, cleansing, and loading of the data from the source systems into the data warehouse.
- **Up flow**- The process associated with adding value to the data in the warehouse through summarizing, packaging and distribution of the data.
- **Down flow-** The processes associated with archiving and backing up of data in the warehouse.
- **Out flow**- The process associated with making the data available to the end-users.
- **Meta-flow**- The processes associated with the management of the meta-data.

TOOLS AND TECHNOLOGIES

Critical steps in the construction of a Data Warehouse are:

- ➢ Extraction
- ➢ Cleansing
- ➢ Transformation

Loading the results into target system can be carried out either by separate products, or by a single, category (s):

- code generators
- database data replication tools
- dynamic transformation engines

Purpose of the Data Warehouse It is work as foundation for decision making process, as for taking considering organization (data related) we preliminary focuses on the DW. Fig. 1 shows a process view of the Data Warehouse. It makes information easy to accessible as we can generate reports, like Operational & Enterprise report from the data warehouse. DW is not only serves analytics, data warehouse is not only serve reporting and analytics as data warehouse can be used as for operational reason like a contact center executive looking at customer single view, while doing up sell or cross-cell to customer.

Why Data Warehousing?

Data explosion in data base management systems (DBMS)Inefficient retrieval of required informationNeeds of Decision Support Systems (DSS) to facilitate decision makingExtracting,

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cleaning, transforming, and filtering data from DBMS and provide efficient access to required information Data warehouse comes to rescue.

Who needs data warehouse?

Decision makers who rely on mass amount of data Those who use customized, complex processes to obtain information from various data sources Those who want to use simple technology to access data Those who require systematic approach for decision.

Two major functions of data warehousing

Extracting necessary information for decision making from heterogeneous data sources and stored in the data warehouse Providing queries and decision analyses to users.

THE BENEFITS OF DATA WAREHOUSING

A data warehouse maintains a copy of information from the source transaction systems. This architectural complexity provides the opportunity to:

- Integrate data from multiple sources into a single database and data model. More congregation of data to single database so a single query engine can be used to present data in an ODS.
- Mitigate the problem of database isolation level lock contention in transaction processing systems caused by attempts to run large, long-running, analysis queries in transaction processing databases.
- Maintain data history, even if the source transaction systems do not.
- Integrate data from multiple source systems, enabling a central view across the enterprise. This benefit is always valuable, but particularly so when the organization has grown by merger.
- Improve data quality, by providing consistent codes and descriptions, flagging or even fixing bad data.
- Present the organization's information consistently.
- Provide a single common data model for all data of interest regardless of the data's source.
- Restructure the data so that it makes sense to the business users.

- Restructure the data so that it delivers excellent query performance, even for complex analytic queries, without impacting the operational systems.
- Add value to operational business applications, notably customer relationship management (CRM) systems.
- Make decision–support queries easier to write.
- Organize and disambiguate repetitive data
- High returns on investment.
- Substantial competitive advantage.
- Increased productivity of corporate decision-makers.

Logical Versus Physical Design in Data Warehouse

Once organization has decided to build a data warehouse we have to define business requirements and agreed for the scope of the application and created a conceptual design, not it is time to translate user requirements to system deliverable and for doing so, we create the logical and physical design for the Data Warehouse.

We need to define as:

- The specific data content
- Relationship must within & between groups of data.
- Data warehouse must be supported by system environment.
- Transformation of data required.
- The frequency with which data is refreshed

Logical design of data warehouse

Logical design is more conceptual. Logical design deals with the logical relationship between the objects for logical design of data warehouse is represented by ER modeling technique. ER modeling involves identifying the entities is called important objects and attributes (properties about objects) and the relationship among them. An entity is a chunk of information which maps to a table in the database while the part of entity is attribute which maps to a column of table into the database.

A unique identifier can be used to make sure the data is consistent. Logical data modeling is the exercise to document and define the relationship between the data elements it involves many things like: Indenting entities from the given set of business environments.eg: customers, orders identifying how specific instants

of each entity are different from other instances like logical keys.eg Customer_ID, order number

Grouping the different attribute that refers to same entity

Finally documenting or making business rules (relationships) between the entities. (E.g. one order must be placed by one customer & customer may place one or more orders). Consideration like ,logical data modeling does not represents any physical data module which shows like how data is stored and does not attempt to anticipate or correct any performance issues that may arise during implementation.

Physical design of data warehouse

Physical design deals with the effective way of storing and retrieving the data from the data warehouse. In the physical design the logical design needs to be converted into a description of a physical database structure using proper mapping of logical database to physical database. Physical design involves creation of the database objects like tables, columns, indexes, primary key, foreign keys, views, sequences etc. Task such as how data will be stored all related business rules to manipulate the data are stored into the physical data modelling. Consideration for how the data needs to be accessed combined joins and the performance characteristics of the intended development environment will be documented. Decision about where to place the data (same database, different databases or different servers) as well as participating archival purging plans, has to be done within the constraints of the business requirements

GOVERNMENT WEB SERVICES

Introduction

"Web Services" have been gathering a great interest from various communities. In the Web Services philosophy, every different system or provider offers some "services" for certain user groups. Any user does its job by just calling proper services over Internet. In general, Web Services seems to have a great potential for wherever there is a need for cooperation or "interoperability". This need has long been felt in spatial data management communities and in traditional governments. This is what has brought the notion e-

government into the scene. It has been envisioned that the e-government will solve the interoperability problems of the governments.

WEB SERVICES

Recently, one of the most used words in the arena of Web technologies is "Web services". Web services, were first uttered by Microsoft chairman Bill Gates at the Microsoft Professional Developers Conference in Orlando, July 12, 2000 (Lewitt, 2001). Web services have emerged as the next generation of Web-based technology for exchanging information. Web services are modular, self-describing, self-contained applications that are accessible over the Internet. Based on open standards, Web services enable constructing Web-based applications using any platform, object model, and programming language (Barefoot, 2002). A service is a collection of operations accessible through an application-programming interface that allows users to invoke a service, which could be a response to a simple request to create a map or a complicated set of image-processing operations running on several computers (Hecht, 2002). Once a Web service is deployed, other applications and Web services can discover and invoke that service.

According to the World Wide Web Consortium (W3C), a Web service is defined as "a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL [Web Services Definition Language]). Other systems interact with the Web service in a manner prescribed by its description using SOAP[Simple Object Access Protocol] messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards" .

In other words, a Web service provides a mechanism for disparate web applications to communicate with each other via standards such as WSDL, SOAP, XML and so on. APIs (Application Programming Interfaces) are usually available for application developers and programmers to access Web services hosted on a remote site over the network, irrespective of the platform or underlying technology.

Finding and publishing a web service

The Universal Description, Discovery and Integration (UDDI) specification provides a set of services that assist in discovering or inquiring about the availability of Web services. A UDDI registry is a directory of business and service information, of which there are two types: public and private. Before a Web service can be discovered, it must first be registered to a UDDI registry. The UDDI publishing APIs6 are designed to create and update Web services entries to the UDDI registry. For .NET implementations, Microsoft provides an alternative technology called DISCO, which is also designed to create and discover .NET deployed web services.

A description of web services

Each Web service has a machine processable description written in Web Services Description Language (WSDL), which is "an XML format for describing network services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information". This WSDL file can be sent directly to perspective users, or published in the UDDI registries. Upon a successful inquiry to a UDDI registry, the WSDL link about the target Web service will be returned to the requester, describing core information about the contents and providing information on how to communicate (or bind) with the target Web service.

INVOKEING A WEB SERVICE

After obtaining WSDL descriptions of the Web service or services required, the requester can invoke those Web services by initiating a SOAP (Simple Object Access Protocol) call to the service provider. The SOAP specification provides information that can be used for exchanging structured and typed information between peers using XML in a decentralized, distributed environment. Web services are delivered by exchanging SOAP messages between the Web service requester and the service provider, typically using HTTP or SMTP protocols to transport messages.

Roles of Web Services Architecture

The Web services architecture is based upon the interactions among three components: Service provider, service broker and service requestor. Service broker is sometimes referred to as service

registry (Cerami, 2002). The interactions involve the publish, find and bind operations. In a typical scenario, a service provider hosts a network-accessible software module (an implementation of a Web service). The service provider defines a service description for the web service and publishes it to a service broker. The service requestor uses a find operation to retrieve the service description locally or from the service broker and uses the service description to bind with the service provider and invoke or interact with the Web service implementation (Kreger, 2001). Figure 1 illustrates these components, and roles.

The components are explained further below: Service provider: From a business perspective, this is the owner of the service. From an architectural perspective, this is the platform that hosts access to the service. Service provider is responsible for developing and deploying the Web Services. The provider also defines the services and publishes them via the service broker. Service requestor: The service requestor is the one who request a service. The requestor locates the Web service using the service broker, invokes the required services, and executes it from the service provider. Service broker: The service broker is responsible for service registration and discovery of the Web services. The broker lists various service types, descriptions, and locations of the services that help the service requestors find and subscribe to the required services.
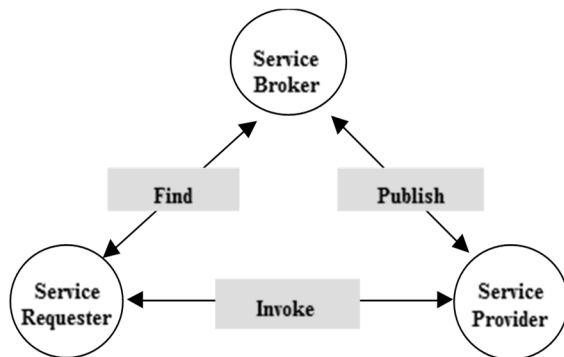
Web Services Technologies

Web Services can be developed using any programming language and can be deployed on any platform. Web Services can communicate because they all speak the same language: the Extensible Markup Language (XML). Web Services use XML to describe their interfaces and to encode their messages. XML-based Web Services communicate over standard Web protocols using XML interfaces and XML messages, which any application can interpret.

The three core XML-based technologies for building and enabling Web services are:

➢ Simple Object Access Protocol (SOAP) defines a standard communications protocol for Web Services.

➢ Web Services Description Language (WSDL) defines a standard mechanism to describe a Web Service.

➢ Universal Description, Discovery and Integration (UDDI) provides a standard mechanism to register and discover Web Services.

When a service provider wants to make the service available to service requestors, he describes the service using WSDL and registers the service in a UDDI registry. The UDDI registry will then maintain pointers to the WSDL description and to the service. When a service requestor wants to use a service, he queries the UDDI registry to find a service that satisfies his needs and obtains the WSDL description of the service, as well as the access point of the service. The service requestor uses the WSDL description to construct a SOAP message with which to communicate with the service (Systinet, 2003).

Despite all its merits, Web services are not free of problems. Some major issues are related to security and privacy. Medjahed et al. (2003) makes a clear distinction between security and privacy and points out that privacy is more difficult to deal with than the security. Web services are also criticized for what they had originally been proposed for; interoperability. However, we do not deal with these issues in this work whose purpose was to seek the feasibility of using Web services for a e-municipality or e-government infrastructure.

Web services for e-municipality

A number of Web services for the investigated activities of the Trabzon Municipality have been designed and partially implemented. These services were developed and deployed using Cape Clear Software (Cape Clear, 2003). A municipality officer can develop his applications using these web services in a very short development time. It took 15 minutes to build a getParcelZoningPlan application which produces ZPF in a fully automated fashion. We currently use static binding of the services for service composition (systinet, 2003). The getParcelZoningPlan is also a web service which calls other web services to do its job. The getParcelZoningPlan will be a service of the Zoning Plan Office (ZPO) of the municipality. The user or the officer in ZPO will initiate this service from his Internet browser. The diagram below summarizes UML getParcelZoningPlan;
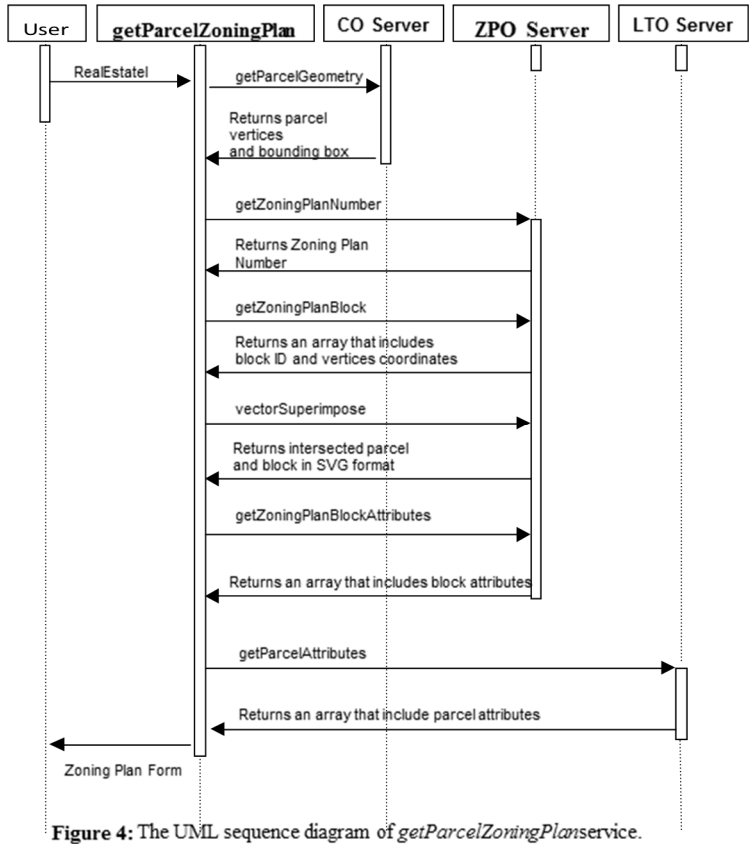
Figure 4: The UML sequence diagram of *getParcelZoningPlan*service.

A brief explanation of the steps of the UML sequence diagram is given below:

- A user sends a parcel's RealEstateID using a HTML Form. GetAParcelsZoningPlanStatus Web service invokes getParcelGeometry Web service in LCD server using RealEstateID. GetParcelGeometry returns an array that includes parcel's attributes, vertice coordinates, and bounding box coordinates.

- GetAParcelsZoningPlanStatus Web service invokes the getZoningPlanID Web service in ZPD server using parcel's bounding box coordinates. Thus, we find the zoning plan's ID(s) that cadastral parcel is located.

- GetAParcelsZoningPlanStatus Web service invokes the getZoningPlanBlock Web service using parcel's vertice coordinates. This service takes vertice coordinates and finds zoning plan block ID(s) using java.Polygon class. Then, it creates an array that includes block ID(s) and coordinates.
- get A Parcels Zoning Plan Status Web service invokes the overlay Blocks And Parcel Web service. It takes two arrays that includes cadastral parcel, and zoning plan block(s) as an input parameter, and creates a GML file. Then, transforms result map from GML to SVG using a XSLT stylesheet.
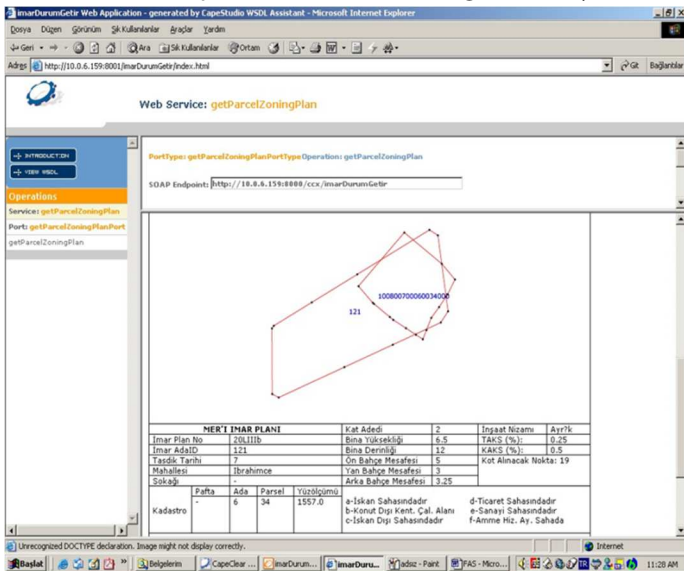
- The getParcelInfo Web service is called. It returns an array that include parcel's attributes. –getZoningPlanBlockInfo Web Service is called. It returns an array that include zoning plan block's attributes. Finally, ZPF is prepared using all returned data by web services, and sent back to the user in the form HTML

Potentials of the Web Services

In this part, the solutions that Web services promise for the problems of the traditional system are identified. For this aim, traditional and web services scenarios of ZPF preparation are

compared. Therefore, given in the following is what happens in the Web services scenario:

- The citizen goes to the ZPO officer as for a ZPF in a short time. He does not have to actually go to the municipality; He can make this request over the Internet.
- ZPO officer initiates getParcelZoningPlan Web service from his internet browser.
- The getParcelZoningPlan calls other Web services to get the ZPF done. These services get the needed data on-line from the remote databases that are Cadastre, Land title, ZPO databases. The services do also the necessary processing.
- The officer takes ZPF output from his printer and submits it to the citizen.

If there is no problem with the communication lines, getting a ZPF would take seconds or minutes. This is a great improvement compared with the traditional way. Therefore, we can say that Web services provide solutions to the aforementioned problems of the traditional system. This is briefed in the following:

Web services enable "quick" services. Citizens and other parties can get answers to their requests within seconds. This greatly improves the service quality and yields very valuable economic contributions.

Web services cut down application development and service provision costs. Because once a number of main services are defined, new services can be built on the existing ones in a short time with a minimum development cost. As already mentioned, developing the getParcelZoningPlan service has taken only 15 minutes. Also, data transfer costs will decline due to both the data transfer medium and reduced transfer requirements of a Web services environment. High quality services will make positive sociological impacts on the people of a country.

High quality services will make people feel honored by their government and they will feel the joy of being served well. This will make them happy and greatly improve every single person's productivity. This continues to be a dream concerning the reality in Turkey.

Web services is a new paradigm which had been envisioned for a notion of environment where everybody provides some services for some others. Therefore, for a Web services based interoperability infrastructure for e-government to work all the involved parties have tohave at least databases plus web services. In other words, Land Title and Cadastre units must have functional databases and must offer services needed by the municipality as well as other parties for the Web services based e-municipality to function.

However, activities of Land Title and Cadastre and municipalities are not limited to each other. There are many parties involved; other government agencies, private sector, universities, citizens and many others. Therefore, what is needed actually is the NSDI for e-municipality and e-government to work. Even the name, "NSDI" may sound obsolete given the implications of the Web services. But, that is another discussion we might face in the coming years.

SECURITY CONSIDERATIONS

When deploying Web services in business, security is one of the important issues that need to be addressed. In this section, we describe the common threats that may affect Web services.

SECURITY THREATS

In 2005, the Web Services-Interoperability Organization (WS-I) published a paper entitled "Security Challenges, Threats and Countermeasures" 11 which identified a number of key threats facing Web services:

1. Message alteration: an attacker alters an original message by inserting, removing or modifying content created by the originator, and the faked message is then mistaken by the receiver as being the originator's real intention. In addition, an attacker may also construct a new fake message to fool the receiver into believing it to have come from a valid sender.

2. Loss of confidentiality: an unauthorized person intercepts and reads a transmitted message.

3. Man in the middle attack: an attacker sits between the real sender and the real receiver and fools both participants by,

for example, capturing and reading all communications from both the sender and receiver and then forwarding modified messages to each of the two parties.

4. Replay of message parts: an attacker replays parts of the captured message to the receiver with the aim of gaining access to an unauthorized system, or causing the receiver to take unnecessary action. This is a variation of threat number 1 above.

5. Replay: an attacker resends a complete message that has been previously sent by some other source, including the attacker.

6. Denial of service: an attacker does a small amount of work on a message that causes the target system to devote all its resources to a specific task so that it cannot provide any services to valid requests.

These threats basically exploit weaknesses in confidentiality, integrity, authentication and availability protection within existing infrastructure.

DEFENCE AND PROTECTION

To prevent against the threats identified above, a number of Web services and HTTP standards have been drawn up. According to the guideline paper "Guide to Secure Web Services" published by NIST, the standards that can help protect identified threats are:

1. W3C XML Encryption: used to encrypt and decrypt digital content. W3C's XML Encryption Working group is developing a standard for encrypting or decrypting the content of XML documents. The working group is also creating XML syntax to represent encrypted content and the information for decryption. With this standard, an XML document would be partially encrypted which effectively means only the sensitive portions of the XML document are encrypted. Different portions can be encrypted with different keys so that the same XML documents can be distributed to various recipients.

Once the XML document is encrypted this way, tags indicating the beginning and end of the encrypted information will appear within the document. As only the XML data is encrypted but

not the whole XML file, the document is still recognised by XML parsers and handled accordingly. Once this standard is adopted, confidentiality can be assured

2. W3C XML Signature: used to provide integrity, signature assurance and non-repudiation. The W3C's XML Signature Working group has also proposed the XML Signature standard, which specifies the syntax and processing rules for applying digital signatures to any XML data. According to the W3C, "XML Signatures provide integrity, message authentication, and/or signer authentication services for data of any type, whether located within the XML that includes the signature or elsewhere." In other words, XML Signatures can be used to ensure that the content within an XML document has not been changed or altered in any way during the transaction process.

XML Signatures rely heavily on a concept called canonicalisation, which has been developed by the W3C mainly to standardise data formats, and compensate for typographical variations in the same piece of data scanned by different file systems and parsers. When a signature is applied to XML content, canonicalisation creates a unique signature using the data and tags in the XML file. This ensures that by applying the same canonicalisation method to the received message content, data integrity can be verified.

3. WS-Security Tokens: used to help the receiver of the message identity and verify the sender. Security tokens provide a mechanism for conveying security information with a SOAP message, and the token itself is described in XML. The following security tokens are supported:

- ➤ Username Tokens: used as a means to identify the requestor by "username", and an optional password;
- ➤ X.509 Tokens: uses an X.509 digital certificate to help authenticate a SOAP message or to identify a public key with a SOAP message that has been encrypted;
- ➤ SAML (Security Assertion Markup Language) Tokens: used to secure SOAP messages and SOAP message exchanges with the help of SAML assertions that binds the subjects (e.g. the sender) and statements of the assertions to a SOAP

message with an XML signature. Three general kinds of assertion statements can be used: authentication, authorization and attribute. These three statements are used at various times in an application to determine who the requester is, what they are requesting, and whether or not their request has been granted. In addition, SAML assertions enable the preservation of security restrictions across different security domains;

➢ Kerberos Tokens: used to allow a service to authenticate the Kerberos ticket and interoperate within existing Kerberos domains;

➢ Rights Expression Language (REL) Tokens: used to implement message level integrity and confidentiality using Rights Expressions as defined in ISO/IEC 21000-5.

4. W3C WS-Addressing: used to help protect against a message replay attack. A uniquely identifiable message ID can be used to detect a message replay, but in order to detect a message replay, the message ID should contain data such as a timestamp so that any legitimate retransmission of the message would not be confused with a replay attack. In addition, the message ID should not be predictable.

5. Other standards used in more traditional Web technologies, including IETF SSL/TLS, SSL/TLS with client authentication, and IETF HTTP authentication methods can also help protect against weaknesses in confidentiality and authentication.

In addition, there are other specifications and standards that are designed to help support the protective measures outlined above. For example, the W3C XML Key Management Specification (XKMS)17 defines protocols for public key management. It defines a way to distribute and register public keys used by the XML Signature and XML Encryption specifications. XKMS comprises two sub-protocols: XML Key Registration Service Specification (X-KRSS) and XML Key Information Service Specification (X-KISS). XKRSS is used for public key registration and X-KISS is used to resolve the keys provided in an XML Signature.

Extensible Access Control Markup Language (XACML) is another specification aimed at enhancing the access control capability of Web Services. XACML is based on the access control matrix model and allows for defining authorisation rules for each element of an XML document, or the document as a whole.

DEPLOYMENT CONSIDERATIONS

The standards described above form the groundwork for SOAP messaging security. All parties involved in message exchange can make use of these XML technologies in the following manner:

1. The message sender specifies the processing intermediaries in the SOAP message header.

2. The message sender can encrypt message headers and sign them using the XML Signature standard.

3. Each part of the SOAP message can be given a different signature that corresponds to the intended processing intermediary.

4. The message sender can utilise XKMS to distribute and register public keys for each processing intermediary

5. Upon receipt of the message, each processing intermediary inspects the signed SOAP headers using an XKMS public key and validates the signature.

6. After validation, each processing intermediary may then utilise XML encryption to decrypt the SOAP headers and the corresponding message component.

This process may be repeated right through the processing chain. Furthermore, each processing intermediary may encrypt and sign additional SOAP headers and message components that are intended for downstream processing.

As SOAP messages are transported using the HTTP protocol, traditional firewalls are not XML-aware and will usually permit all XML traffic to go through without further checking. That is, a network firewall cannot add extra protection to SOAP messages. It is advisable therefore, when implementing Web services without the support for WSSecurity, to deploy XML gateways or firewalls that can perform XML checking.

In addition, as with normal applications, a secure audit log of all messages going in and out should be kept. The log should

provide sufficient information to support comprehensive audits of the effectiveness of, and compliance with, the intended security measures.

STATE DATA CENTRE

State Data Centres (SDC) are multiple data centers set up in various states of India to provide fundamental IT infrastructure for various e-governance programs being run as part of National e-governance Plan of India. The main purpose of these centers is to provide a physical facility for hosting various state level e-government applications similar to what National Informatics Center (NIC) provides to the national level applications. The SDC project was approved in January 2008 as a part of the National eGovernance Plan.

The State Data Centres project is meant to build up state's services, applications and infrastructure on a common platform in all the states and union territories of India. SDCs project is planned to work together with State Wide Area Network project to achieve its goals. A SDC will work as a physical storehouse of public and private data which will act as a centralized databasefor various eGovernment applications. In addition to this, a SDC will provide basic IT infrastructure for implementing server side technologies viz. systems like web servers, application servers and database servers etc. for different applications

Key-supporting element of e-Government initiatives & businesses for delivering services to the citizens with greater reliability, availability and serviceability are as follows.

- State Data Centre acts as a mediator & convergence point between open unsecured public domain and sensitive government environment.
- It enables various State departments to host their services/applications on a common infrastructure leading to ease of integration and efficient management, ensuring that computing resources and the support connectivity infrastructure (SWAN/NICNET) is adequately and optimally used.

STATE DATA CENTRE: OBJECTIVES

- ➢ Create state-of-art Data Centre infrastructure coupled with communication and other infrastructure.
- ➢ To provide shared, secure and managed infrastructure for consolidating and hosting State level applications with the view to provide G2G, G2C, G2B services.
- ➢ To provide fast, efficient and secure online services to the citizens.
- ➢ To provide trustworthy and managed environment, where citizens can conduct secure transactions.

SERVICES

The following types of services are expected to be provided at the SDCs:

1. Application and web hosting.
2. 24*7 support for data and application availability.
3. Centralized network and database management.
4. Security of private data.
5. Backup & archival Services.

IMPLEMENTATION/ KEY CONSISDERATIONS

The implementation guidelines have been stated very clearly by the government. The key considerations of the project are:

1.Scalability
2.Availability
3.Security
4.Manageability
5.Reliability
6.Migration from Distributed to Centralized environment
7.Interoperability
8.Compliance to Standards

SDC- IMPLEMENTATION ISSUES

1. Site Availability
2. Raw Power Availability
3. Constitution of Project Implementation Committee: Lakshadweep, Andaman, J&K, Arunachal Pradesh and Bihar yet to constitute PIC.
4. Finalization of Application for FAT thus delaying finalization of RFP.

5. MOU between NIC and States- formation of composite team 8 States -Signed the MOU with NIC.Andhra Pradesh, Gujarat, Tripura, MP, Jharkhand, Manipur, Mizoram and Nagaland Reminder sent to the remaining States.

6. Dedicated Project team with SIA SIA to initiate action towards recruitment of Domain Experts for SDC out of the funds released to the States as per the Guidelines.

7. Need to adhere to strict implementation timeline s

Implementation Challenges

- Effective Capacity Planning
- Project Management and Monitoring
- Technology & solution selection
- Clearly defined SLAs
- Application hosting/migration/application management
- The move to service orientation as an end objective

Best Practices

- Implement Service Level Management
- Implement Change Management Process
- Keep relevant documents and policies updated
- Adopt industry Standardizations e.g ISO 27001, ITIL practices etc.
- Unify the Data Centre Management up to extent possible
- Perform regular audits

Chapter IV
DIGITILIZATION OF STATE AND REGIONAL ADMINISTRATION

Digitalization means the use of digital technologies and of data (digitized and natively digital) in order to create revenue, improve business, replace/transform business processes *(not simply digitizing them)* and create an environment for digital business, whereby digital information is at the core.

1. **Current Status and Tasks**

Digitization of the administration is designed to raise convenience of the people, simplify the administration, and improve efficiency and transparency of it, through the use of IT in every field of the administration and review of existing systems and practices.

Also, amidst the ongoing progress of digitization and networking in socioeconomic activities, if the public sector is to continue their administrative work as in the past on a paperwork basis, it will bring about obstacles to those various efforts in the private sector in many stages, and to make matters worse, it would hinder the formation of an advanced information and telecommunications network society.

Over the years, the central government has comprehensively promoted digitization of the administration in a well-planned manner, which includes provision of a PC to each staff member requiring it for their work, connection of all the office and ministries to the Kasumigaseki WAN and establishment of websites.

While the construction of an information and telecommunications infrastructure, including deployment of PCs and LAN/WAN, has been steadily implemented; however, i) an effort to reform internal administrative work to paperless has just begun, and ii) a move to employ electronic filing (online procedures for application and notification) -- one of the important challenges upon introducing IT between the government and the people, companies and others - has been at an initial stage, except for a very limited number of procedures associated with import/export and patents. These are both urgent tasks to be implemented and realized by FY2003.

Consequently, from now on, it is essential that digitization of administrative work and projects shall be the mainstream by making the use of electronic information a principle. In particular, upon introducing electronic filing (online procedures) between the government and private businesses/ consumers, the government should not just make the existing administrative work online, but must reform administrative operations, integrate similar work and projects across the office and ministries, review systems, laws and regulations at the same time, and push one-stop administrative services for improved efficiency of the administration and reduced burden on people and companies.

In this case, a planned investment for the introduction of IT according to the mid- and long-term schedules must also be carried out.In the meantime, for digitization of local governments, the central government must provide full support with a particular emphasis on the creation of environments such as legal frameworks, including construction of an information and telecommunications infrastructure. In parallel with digitization of the administration, digitization in other public areas is expected to improve convenience of everyday life and lead to explosive diffusion of IT in the entire society and economy. In particular, the utilization of the Internet will improve accessibility of the people to public services. Also, as the people's needs can be accurately collected, new public services may be created.

For this purpose, in line with the Basic Guidelines on the Promotion of an Advanced Information and Telecommunications Society (adopted in February 1995 and revised in November 1998), each ministry and agency formulated a guideline describing targets, mid-range policies and their implementation plans in respective fields. Based on those guidelines, steady progress toward those targets has been seen. For instance, in some cultural, welfare and other fields, information databases have been created and networking has also been implemented. In other fields, satisfactory results such as telemedicine using IT, weather observation based on satellites, etc. have been achieved.

In order for all the people to enjoy a more improved quality of life, R&D shall be continuously promoted to make use of IT and provide high quality services in these public areas involving frequent contacts with the people. Also, an advanced information and telecommunications infrastructure as well as leading applications shall be actively introduced to enrich those services.

2. **Significance of Policy Measures**

Digitization of the administration will enable administrative procedures at national and local governments to be conducted without any geographic or time constraints, thus contributing to increased comfort and convenience for the people and revitalization of industry activities. In fact, it will make administrative services accessible for principally 24 hours a day over the Internet from home or office, resulting in drastic improvement of convenience for the people and private businesses.

In particular, national administrative bodies will promote reforms of administrative work, projects and organizations, and make a shift from "paper-based" information management to the network-based electronic information management, while taking ensuring of security into account, through digitization of the administration. Thus, the government will realize a highly computerized administration, or an "electronic government (e-government)," as explained below.

Major items	Picture in FY2003
Provision of administrative information by electronic means	- It will be made possible to electronically obtain press-released documents and other administrative information, including the one on organization and duties of administrative organs, laws and regulations falling within their jurisdiction, plans and performance of measures and projects, reports and statistical survey results of which release on the official gazette is made compulsory, and reports from advisory

	councils, easily, basically 24 hours a day, from their websites, separately from the paper-based information.
Electronic filing (application, notification, etc.)	- It will be made possible to file substantially all applications and notifications from home or office, basically 24 hours a day. Example: Procedures related to national tax declaration, telecommunications business, trade management, and trucking/shipping/ air service.
Electronic procedures for revenues and expenditures	- It will be possible to pay handling charges for application and notification procedures, taxes, etc. via the Internet.
Electronic procurement	- Tendering and bid opening via the Internet will be possible (primarily by FY2004 for public works).
Paperless (electronic information)	- By using the office and ministries' LANs and the Kasumigaseki WAN, practically all the current paper-based distribution of deliberations of laws and regulations, notification of various conferences, and administration- related documents (circulars) will be made electronically (paperless).

The promotion of digitization of various public services to the private sector, including health, medical care, welfare, culture, transportation, disaster prevention, etc. is expected to bring about improvement in quality of national life as a whole, through the provision of diversified and high-quality public services.

Also, the utilization of these services may enable the people to voluntarily form networks and participate in the administration, community and social activities, which can lead them to satisfaction in a real sense.

In addition, if many people experience the benefits of IT as something readily accessible in various fields, such as using information stored at libraries and museums from home or getting various kinds of information including a video from a moving car, it may exert far-reaching effects upon introducing IT into the whole nation. Particularly, digitization in these public areas, which are closely related to daily lives of the people, will contribute to the improvement of information literacy of all, correcting the digital divide.

Also, in order to achieve these targets, the central government will provide required support to local governments while keeping close collaboration with them.

3.**Priority Policies**

Digitization of the Administration

i) Digitization of administrative services to the people and businesses

By enabling the people and businesses to have access to various administrative information and to make use of easy file application, notification and other procedures via the Internet, the administration that handles electronic information in the same way as paper-based information will be realized. For this purpose, electronic delivery of administrative information and online handling of application, notification and other procedures will be implemented rapidly and with priority, in order to contribute to the improvement of convenience for the people, etc. as well as simplify and improve efficiency and transparency of administrative management.

a)Electronic delivery of administrative information

In early FY2001, each office and ministry will formulate an intensive action plan for the period from FY2001 through FY2003, in line with the "Framework for Electronic Delivery of the Administrative Information (Guideline)," adopted in March 2001 by the "Inter-Ministerial Council for Promoting the Digitization of Public Administration."

- Information delivery, in principle, at websites of the office and ministries of information on various administrative

activities, information conducive to the effective utilization for the public, and information obliged by statute to be made public

- Improvement of convenience through enrichment of whereabouts information and a browsing function across office and ministries from a webpages (information clearinghouse)
- Timely provision of information and updating of content provided
- Improvement of information provision in an easy-to-understand and easy-to-access manner
- Ensuring of two-way information distribution between the people and the administration

b)Electronic filing (application, notification and other procedures)

Practically all the application, notification and other procedures between the people and the administration will be made available over the Internet at the earliest possible time by FY2003.

When application, notification and other procedures go online (electronic filing), each office and ministry shall set up the appropriate unit price of handling charges, while reducing administrative costs involved in it.

(i) Each office and ministry will review its own existing action plan from the standpoints of i) moving up the schedule for introducing electronic filing of individual procedures, ii) drastically reexamining the procedures themselves, for instance, streamlining, and iii) digitizing related clerical works. Then, each office and ministry will formulate a new action plan in early FY2001. (MPHPT and all the office and ministries)

(ii) To ensure attainment of electronic filing targeted by FY2003, the following items will be promoted:

- Each office and ministry will establish a common infrastructure system for electronic filing, consisting of the Cabinet Office/Ministries Certification Authority and a "General-purpose Acceptance System," which can be utilized for accepting various procedures and notification of the results thereof by FY2002. (All the office and ministries)

- Accordingly, by early FY2001, basic specifications will be established at the Inter-Ministerial Council for Promoting the Digitization of Public Administration, regarding those required to coordinate across the office and ministries for consistency, when constructing the "General-purpose Acceptance System." (MPHPT and all the office and ministries)

(iii) Each office and ministry will make the best effort to establish an electronic filing system for individual procedures by FY2002. (All the office and ministries)

(iv) The following measures will be taken for one-stop services

MPHPT, from FY2001, will commence operations of a general reception system (information clearinghouse system) on the web, capable of retrieving web-based information across the office and ministries, including procedural information on electronic filing (application, notification and other procedures) as well as application forms, etc. The people will be able to access to application/acceptance systems of administrative procedures in the office and ministries through this general reception system by FY2003. (MPHPT)

For import/export and harbor-related procedures, a study framework to deliberate on methods of enabling efficient sharing and utilization of information through networks across the relevant office and ministries will be created within FY2001. To do this, documents submitted to date, including statistical information, will be thoroughly reviewed to implement standardization, combine or eliminate documents overlapped among the office and ministries and paperwork hitherto required for mere reference information. Also, the consolidation of application formats will be considered. In addition, the Nippon Automated Cargo Clearance System (NACCS)[1] and the Harbor EDI system[2] will be connected within around FY2001.

The NACCS and the Japan Electronic Open Network Trade Control System (JETRAS) based on the Foreign Exchange and Foreign Trade Law will be cooperated by around FY2002; and the NACCS, the Harbor EDI system and the Crew Landing Permit Support System (tentative name)[4] will be cooperated by around FY2002. Moreover, as

part of efforts for electronic import/export procedures that are slated for completion by FY2003, the utilization of storage infrastructures (warehousing facilities) in the private sector and the feasibility for connection of the import/export procedures declaration/application/reception systems with privately owned systems concerning electronic procedures for trade will be studied. (MOF, MOJ, MHLW, MAFF, METI and MLIT)

For procedures relating to the ownership of automobiles[5], efforts will be made for the target of making one-stop services operational through electronic procedures in around CY2005. Accordingly, by taking into account the financial situation of local governments, specific regions will be designated for field trials of the system by around CY2003. (MLIT and the relevant office and ministries)

c) Digitization of procedures for government procurement

Through digitization of government procurement procedures to allow easy access to procurement information via websites of each office and ministry and enable electronic tendering and bid opening based on Internet technologies, the relevant office and ministries will endeavor to alleviate burden on businesses, simplify and streamline administrative work.

(i) Government procurement except public works (MPHPT and all the office and ministries)

The government will launch operations by FY2001 of an integrated government procurement information database, in which web-based procurement information at each office and ministry is consolidated, and introduce electronic tendering and bid opening based on Internet technologies by FY2003.

(ii) Government procurement for public works (MLIT and the relevant office and ministries)

In October 2001, web-based electronic tendering and bid opening will be started for part of projects under direct control of the office and ministries. In principle, electronic tendering and bid opening will be introduced for projects under ministerial jurisdiction by FY2004. In addition, for MLIT, the Continuous Acquisition and Life-cycle Support/Electronic Commerce system (CALS/EC) will be built by FY2004.

d)Electronic management of revenues and expenditures

Through electronic management of revenues and expenditures, the government will alleviate the burden on the people and improve their convenience.

For payment of revenues/national taxes and transfer of expenditures/national tax refund, provided that such systems are operational at the Bank of Japan and other financial institutions, necessary systems will be made operational by FY2003 to enable payment and online transfer over the Internet, etc.

e) Support for local governments in their digitization endeavors

To ensure that all the people can benefit from IT, local governments, which are close to inhabitants, will have to play an important role. Thus, the central government will support local governments in their efforts by clearly identifying urgent tasks and support measures for them.

(i) To ensure that municipalities (cities, towns and villages) can promote measures for digitization of themselves, support functions such as collecting/providing information, advising, training and raising awareness will be expanded within FY2001. In addition, support measures will be considered to enable local governments to smoothly introduce electronic management of revenues/expenditures and bidding procedures in keeping pace with the implementation schedule of the central government. (MPHPT)

(ii) Upon making local governments' administrative services available online, the relevant office and ministries will formulate action plans in early FY2001 concerning the proposal of standard specifications for individual procedures and the timing of revision of laws and ordinances, based on requests from local governments and the people. (MPHPT and the relevant office and ministries)

(iii) In addition to the support for building the authentication infrastructure for organizations and individuals at local governments, basic specifications of a "General-purpose System," which can be used for multiple procedures including acceptance of applications and notifications, delivery of notices of results, etc., will be established within FY2001. (MPHPT and the relevant office and ministries)

Digitization of administrative work and projects

Administrative operations will be simplified and their efficiency increased by realizing operations, in principle, based on electronic information throughout an entire lifecycle of documents, while reviewing clerical work operating procedures and related rules associated with documents generated and collected on a daily basis.

For this purpose, operations will be intensively reviewed for the purpose of sharing/utilizing information over information networks and rendering the administrative work paperless, especially clerical tasks common to the office and ministries. Furthermore, the government will prepare IT equipment as an infrastructure for the paperless, network such equipment, create a database of sharable information, and improve literacy of the staff thatuses them.

a) Paperless(electronic information)

By promoting rapid decision-making, streamlined/efficient clerical work, alongside with a review of operations, and providing a comprehensive/wide-area network that connects national administrative organs with local governments, the collection, transfer, sharing and processing of information among the individual administrative bodies will be digitized.

(i) In line with the "Action Plan for Paperless Administrative Clerical Work (adopted by the Advanced Information and Telecommunications Network Society Promotion Headquarters in December 1999), 57 items of clerical work that was identified to be made paperless across the office and ministries, such as "communications/notifications" and "information sharing," shall be converted to paperless by FY2002. (MPHPT and all the office and ministries)

(ii) Along with the action for paperless, each office and ministry shall establish document management rules, etc. concerning storage/management of electronic information and access control, etc. within FY2001 to properly manage/share electronic information. (All the office and ministries)

(iii) Regarding official reporting among office and ministries, those authorities that are responsible for being reported shall reach a

conclusion on how to make it paperless by FY2002, and implement it by FY2003. (Relevant office and ministries)

(iv) A network connecting LANs of headquarters of the office and ministries with LANs of regional bureaus and branch offices will be accomplished by FY2003. (All the office and ministries)

(v) As regards the Local Government WAN (LG WAN) that connects all local governments, all prefectures and designated cities are requested to be connected by FY2001, and all municipalities by FY2003. In addition, the interconnection between the LG WAN and the Kasumigaseki WAN will be implemented from FY2002. (MPHPT and all the office and ministries)

b) Improvement of information literacy among the staff and their mindset reform

In the IT society, the clerical work that has been based on face-to-face contact or paper documents within an administrative body or between administrative bodies and the people will go online, enabling all such work to be done over information networks. Thus, it is necessary to improve information literacy among the staff and reform their mindset.

(i) MPHPT will review and improve the "Training of Information Systems" within FY2001 regarding common issues across the office and ministries, in order to develop core personnel in charge of digitization and intensify activities to raise awareness for information literacy among the staff. (MPHPT)

(ii) Each office and ministry will review its staff training plan within FY2001 along with a progress made in digitization of the administration, and raise awareness of the staff members to the fullest on this issue. (All the office and ministries)

iii) Others

- **Review of laws and ordinances**

(i) The Cabinet Secretariat, in cooperation with the relevant office and ministries, will establish basic guidelines concerning the review of laws and ordinances in accordance with the introduction of electronic filing systems for applications, notifications and other procedures in early FY2001. (Cabinet Secretariat and the relevant office and ministries)

(ii) Each office and ministry will review the laws and ordinances within FY2001, in line with the above basic guidelines and new action plans. (MPHPT and all the office and ministries)

- **Promotion of outsourcing**

    The government shall actively promote outsourcing to cope efficiently and effectively with further expanding operations related to information systems and with advancing technologies.

    (i) In line with the "Promotion of outsourcing of operations concerning information systems in national administrative organs" (adopted by the Inter-Ministerial Council of Government Information Systems in March 2000), each office and ministry will, in early FY2001, clearly specify priority operations, that the staff in charge shall conduct by themselves, among all of those concerning information systems, and implement outsourcing of the rest in a well-planned and emphasized manner during the period up to FY2003. (All the office and ministries)

    (ii) MPHPT will follow up on the progress of outsourcing in each office and ministry, and release the results. (MPHPT)

- **IC card (Cabinet Secretariat and the relevant office and ministries)**

    In order to improve convenience of the people and reduce administrative costs, the idea of storing multiple pieces of information in the IC card that is issued from administrative organs will be studied, except for those cards such as driver's licenses, that are studied for ensuring international harmonization. To this end, the relevant office and ministries will jointly study such possibilities from the aspects of regulatory frameworks, technology, costs, convenience and security, and formulate basic specifications at the earliest possible time within FY2001.

- **Formulation and widespread use of evaluation indicators concerning the system development (METI and the relevant office and ministries)**

    To popularize systems development/procurement, backed up with experiences, matching an IT society, a "Process Indicators' Model for Development and Procurement of Software"[7] will be formulated within FY2001. Moreover, from the standpoint of

promoting further competition, a study will be carried out to promptly introduce and popularize such procurement methods that reflect characteristics of software by, for instance, utilizing the above models.

- **Clarification of necessary expenses and effects of major projects, and release of the evaluation results of actual progress thereof to the public (All the office and ministries)**

  Beginning in the summer of 2001 at the time when making a budget request and a draft budget, from the standpoints

  i)   to ensure improvement of transparency/reliability of the administration,

  ii)   to precisely manage the progress concerning digitization of the administration, and

  iii)   to effectively and efficiently implement related measures, each office and ministry will clearly explain the expenses and effects of major projects for an electronic government over two or more fiscal years, making reference to the "Standard Guidelines for Policy Evaluation," adopted in January 2001 by the Liaison Conference for Policy Evaluation. Subsequently, each office and ministry will evaluate the progress of them, and make the results public every fiscal year.

➢ NACCS: A system for online processing of customs procedures concerning the international freight. It consists of two different systems, i.e., the airfreight customs clearance information system (Air-NACCS) and the ocean marine cargo customs clearance information system (Sea-NACCS).

➢ Harbor EDI system: A system for online processing of administrative procedures, such as those for application and notification, as associated with the port manager and harbormaster

➢ JETRAS (Japan Electronic open network Trade control system): This is an export/import permission and approval system that is based on the Foreign Exchange and Foreign Trade Law. It uses an open network for online processing of the trade management

work in general, including aid in application for export/import permit and declaration to customs.

➢ Crew Landing Permit Support System (tentative name): A system for online processing of administrative procedures, such as application concerning crew landing permission

➢ Procedures relating to the ownership of automobiles: Various administrative procedures accompanying the ownership of automobiles such as inspection, registration, parking certificate and tax payment.

➢ CALS/EC: A system capable of digitizing various information generated in the overall lifecycle of public works (study/planning, design, bidding, execution of work and maintenance) and exchanging/sharing the information efficiently by using networks

➢ Process Indicators' Model for Development and Procurement of Software: Models that integrate such evaluation indicators as design and maintenance of software, as well as methods necessary for successful procurement thereof

Other Public Areas

i) Digitization in the science/technology and academic fields

The construction of an information infrastructure for science/technology and academic information will be promoted to create and maintain the world's highest level of research environment for further advancement of research standards and to provide information promptly and adequately to researchers from industry, academia and governments.

a) Construction of the Super SINET (MEXT)

The Super SINET (Super Science Information Network), which connects research institutions at the maximum speed of 10Gbps, will be built at five national universities and six inter-university research institutions within FY2001, and at a total of 25 to 30 universities and research institutions throughout the nation by FY2005.

b) Construction of ITBL (IT-based Laboratory) for virtual research (MEXT and the relevant office and ministries)

To realize technological innovation in various leading-edge technology fields by introducing IT into R&D, a virtual research

environment, ITBL, will be built by FY2005, that enables the state-of-the-art simulation, etc. through shared use of supercomputers among all laboratories in the nation via a large-capacity network.

c) Creation and sophistication of various databases required for R&D (MEXT)

The integrated digital content retrieval system will be created within FY2001, which enables researchers to easily and rapidly retrieve large-scale, complex research information being connected to networks.

ii) Digitization in the art and culture fields

In response to the enhancement and diversification of the people's interest in culture, an environment will be provided to enable retrieval and use of information on various cultural assets, artworks, community culture and theatrical arts, without any geographic constraint. Thus, the integrated culture information system will be provided. (MEXT)

By FY2005, information databases of cultural assets and artworks preserved in national museums as well as on performances at the National Theater of Japan and national/public cultural facilities will be created to offer information from the websites of those relevant institutions. Furthermore, by networking these databases with municipal and private museums, etc., the common indexing system will be created for information on arts stored.

iii) Digitization in the health, medical care and welfare fields

The government will promote to improve the quality and efficiency of services in the field of medical care through digitization, and meet the new service needs, such as those for telemedicine with the use of IT. Furthermore, a barrier-free environment, which is gentle on everybody, will be prepared by developing and popularizing information and telecommunications equipment/systems that are made under the universal design concept for everyone, including the elderly and people with disabilities.

To this end, digitization in this field will be promoted.

a) To offer diverse and high-quality medical care services with improved efficiency, the strategic grand design will be

formulated by early FY2001. The grand design will describe measures and targets for popularizing digitization of medical care, such as digitization of various medical information like electronic charts, promotion of telemedicine, and computerization of review and payment of receipts. (MHLW)

b) Electronic charts will be standardized by FY2003 by developing the format of electronic data interchange (EDI), electronic means of information interchange and information security technologies. The ordering system, that is, digitized medical information interchanges across medication, inspection and medical clerical work sections, as a basis of electronic charts, will be introduced to hospitals at the targeted rate of 20% thereof by FY2005. (MHLW, METI)

iv) Digitization in employment field

By offering timely employment information, an environment with better employment opportunities will be created.

For this purpose, an employment information system will be created through the joint initiatives between the public and private sectors. (MHLW)

An information system will be provided within FY2001 for job seekers, so that they can browse and retrieve indexed job opportunities information held by private employment agencies, private job opportunities information providers, economic organizations, Public Employment Security Offices, etc. and can access the websites of private businesses.

v) Promotion of Intelligent Transport Systems (ITS)

Intelligent Transport Systems (ITS) will be promoted, which are to engineer a solution against road transportation problems, such as traffic jams, traffic accidents and environmental deterioration, by connecting the people, roads and vehicles as an integrated system through the use of leading-edge information and telecommunications technologies. Besides, R&D on key technologies for the promotion of ITS will also be expedited.

a) Enhancement of road traffic information provision (NPA, MPHPT and MLIT)

i) As for the Vehicle Information and Communication System (VICS) that can display traffic jams, traffic control and other road traffic information on the screen of a car-mounted navigation system, the service will start in virtually all parts of the nation within FY2002.

ii) Necessary regulatory reforms will be made within CY2001, such as submitting of a bill to amend the Road Traffic Law, so that private businesses will be allowed to edit and process road traffic data for providing it as highly value-added information. In addition, optical beacons (infrared two-way communications equipment for the Universal Traffic Management Systems (UTMS) that provide/collect traffic information) will be installed by FY2005 to cover most of the major open roads in urban areas.

b) Promotion of driving support systems (MPHPT and MLIT)

R&D on driving support technologies, which provide drivers with necessary information, warning and operational instructions, will be promoted, so that the support systems will be put into practical use on the 2nd Tomei and Meishin Expressways by around CY2003.

c) Promotion of the Electronic Toll Collection (ETC) **system** (MLIT)

The ETC service for general users will be expanded to major tollgates throughout the nation within FY2002, and within five years or so, toll payment methods will be limited only to ETC on expressways in urban areas.

d) Promotion of international standardization of ITS technologies (NPA, MPHPT, METI and MLIT)

For the next five years in which a real progress of ITS is expected, efforts will be made for international standardization of various ITS technologies by proposing vehicle travel support systems, narrow-band communications (DSRC)[8] systems, etc. to the International Organization for Standardization (ISO) and the International Telecommunication Union (ITU), while keeping up efforts of strengthening international competitiveness of the ITS-related industries.

vi) Digitization in the environmental field

To cope with global environmental problems, environmental information will be provided to the public, etc. in an easy-to-understand manner to encourage their voluntary environmental protection activities and, at the same time, the use of environmental monitoring technologies will be promoted.

a) Creation of a comprehensive environmental information database (MOE)

MOE will create a comprehensive environmental information database, and provide information to the people and businesses via the Internet in an easy-to-understand manner by FY2003. Such an information database will, for instance, include a system that collects information possessed by the central government, local governments and the private sector, and centrally controls emission of greenhouse gases.

b) Introduction of the environmental monitoring system utilizing artificial satellites, (MOE)

To prevent environmental pollution, the environmental monitoring technology and the illegal dumping detection systems utilizing artificial satellites will be developed by FY2003.

c)Realization of global environmental changes forecast using the world's fastest computer (MEXT)

The earth simulator, which offers the world's fastest computing and enables forecast of global-scale environmental changes, such as global warming and abnormal weather conditions, will be operational in FY2001, so that a highly accurate global environmental changes forecast will be realized by FY2005.

vii) Promotion of Geographical Information Systems (MLIT, MPHPT, MAFF, METI and the relevant office and ministries)

Under the cooperation between the public and private sectors, while ensuring consistency with the international rules, GIS will be promoted to put geographical information in order, construct a mechanism of distribution and use of such information via the Internet by around FY2003. In addition, the standardization of geographical information will be promoted i) to streamline and improve efficiency of administrative fields such as disaster

prevention, urban planning, traffic, environment, education, and private operations, ii) to create new business methods, and iii) to sophisticate and diversify national life.

a) Digitization and provision of geographical information

By looking into legal aspects concerning the use of electronic geographical information, electronic data for the 1:25000 topographic maps will be prepared within FY2001; and its provision over the Internet will be started by FY2002. At the same time, while encouraging effective use of such data currently being in the possession of private businesses, digitization and provision of such geographical information relating to roads, city blocks, rivers, seas, etc. will be promoted. In addition, by FY2003, the expansion of registered content, etc. to the Geospatial Data Clearinghouse[9] will be realized; and specifications such as data structures will be standardized as JIS to enhance retrieval functions.

b) Solutions for technical problems

Various technical problems will be resolved, including i) establishment of JIS standards for G-XML in early FY2001 (a communications protocol for distributing geographical information over the Internet); ii) proposals of it to the International Organization for Standardization (ISO) within FY2003; iii) development of key technologies for 3-D GIS within FY2001; and iv) development of a web mapping system (a system enabling the use of GIS functions over the Internet) within FY2003.

viii) Digitization in disaster prevention field

In order to create a society in which the people can safely live, by ensuring rapid collection/ transmission of information for disaster prevention, a highly advanced information and telecommunications system will be built that interlinks the central government, local governments, and residents.

a)Development of a comprehensive disaster prevention information system (Cabinet Office)

Various types of disaster prevention information will be standardized to create a nationwide database; and a system enabling shared use of the information among disaster prevention organizations and the people will be prepared by FY2003.

b)Construction of a volcanic disaster prevention system (Cabinet Office)

Through the utilization of digital volcanic hazard maps[10], a volcanic disaster prevention system will be built by FY2003, enabling designation of a dangerous region and display of evacuation routes in quick response to the status of volcanic activity.

c)Development of a disaster damage tracking system using artificial satellites (Cabinet Office)

A system that keeps track of disaster information quickly and accurately by using images sent from artificial satellites will be built by FY2003 for use in disaster prevention activities.

d)Sophistication of national land management (MLIT)

At points of critical importance for disaster prevention purposes, a disaster information network comprising a monitoring equipment, information provision equipment, information networks, etc. will be established by FY2003 to enable remote control and monitoring of land conservation facilities. In addition, the government will ensure disaster prevention, damage control and safety by enabling crisis avoidance behaviors, including positive disaster prevention activities and evacuation through prompt and accurate sharing/provision of information.

BRIDGING AND DIGITITAL DIVIDE

The "digital divide" - a term that refers to the gaps in access to information and communication technology (ICT) - threatens the ICT "have-nots", whether individuals, groups or entire countries. Education and learning lie at the heart of these issues and their solutions. The gaps that define the "learning digital divide" are thus as important as the more obvious gaps in access to the technology itself.

A **digital divide** is an economic and social inequality with regard to access to, use of, or impact of information and communication technologies (ICT). The divide within countries (such as the digital divide in the United States) may refer to inequalities between individuals, households, businesses, or geographic areas, usually at different socioeconomic levels or other demographic categories. The divide between differing countries or regions of the

world is referred to as the global digital divide, examining this technological gap between developing and developed countries on an international scale.

As we enter the 21st century, the emerging features of the "New Economy" can be seen everywhere. At the heart of these changes are the innovations made possible by Information and Communication Technology (ICT), which are transforming the ways in which economies, and the people within them, are working. ICT has become one of the main drivers of growth, but economic growth, important as it is, must be promoted in tandem with social and democratic objectives, especially in tackling exclusion. The risk for some of being disconnected through being unable to participate in the modern economy is now acute, with participation conditional to a large extent on accessing ICT with confidence and competence. This is increasingly the condition for involvement in the decision-making and community activities that also define participation in society.

The importance of ICT to both economic and social development explains the priority of bridging what has come to be known as the "digital divide". This is, in fact, a whole series of interlocking "divides" - the gaps that separate segments of society as well as whole nations into those who are able to take advantage of the new ICT opportunities and those who are not.

People, education and learning lie at the heart of these issues and their solutions. The machines and sophisticated ICT equipment are useless without the competence to exploit them. Nurturing this competence is in part the job of schools and colleges, where the foundations of lifelong learning and "technological literacy" are laid. In part, it is dependent on the learning that takes place throughout life in homes, communities, and workplaces. Education and learning are now the lifeblood of our 21st century knowledge societies, and ICT has become integral to them. The gaps that define the "learning digital divide" become as important as the more obvious gaps in access to the technology itself.

The Four Digital Divides

The "digital divide" is widely regarded as a unitary phenomenon. And as a first approximation, it is indeed useful to distinguish, in a general way, between the rich and powerful who are part of the Information Age and the poor and powerless those are not. But viewed analytically, there is not one, there are three digital divides -- and emerging in many nations a fourth.

The first divide is that which exists within every nation, industrialized or developing, between those who are rich, educated, and powerful, and those who are not. For example, income and education in the United States distinguish dramatically between those who own computers and those who do not, as between those who can access the Internet and those who cannot. In the United States, where household telephone penetration is about 95%, in 1999 households with incomes over $75,000 (roughly, the top 10%) were twenty times more likely to have Internet access than those in the lowest income brackets: 80% of the rich and 5% of the poor had access to the Internet. If we analyze home ownership of computers, rich households were nine times more likely to own one. If we compare Americans with four years or more of university with those who have six years or less education, computer ownership figures are 69% 4 versus 8% and the Internet access percentages are 49% versus 3%. Similar results were found in a survey in Australia.

As of mid-2002, no comparable studies have been conducted in India, where telephone connectivity is extremely low (about 3%) and the installed base of computers and Internet connections even lower. But the overall pattern is clearly similar to that in America. As of early 2002, there were approximately six million computers in India, of which perhaps two-thirds were in businesses, schools, government offices, etc. -- leaving, at a high estimate, two million computers in households. In mid- 2002, there were probably about a million Internet connections in India, again most of them in institutional settings rather than individual households. A figure of 1,000, 000 Indian Internet-connected households (out of about 200,000,000 households) in 2002 would be on the high side.

Assuming three computer and Internet users per household, we arrive at a figure of six million Indians who have computer access at home and perhaps three million who have Internet access. (This compares with well over 70% household computer saturation and 60 % household Internet connection in the U.S. in 2002.) In India, then, in mid-2002, with a billion population, less than 1 % has home access to computers, and at most 0.5% of the population has home access to the Internet.

Who is the 'connected' in India? Obviously, as a group, they are a small, rich, successful and English-speaking minority. For all of its ancient cultural wealth, despite the persistence of old elites and the emergence of new elites, India remains one of the world's poorest societies. Details are known to all Indians and are available in any almanac: hundreds of millions go to bed hungry; more than 40% of the population are illiterate; tens of millions of 5 children are not in school; as many as 50% of all Indian newborns are born below ideal birth weight; preventable diseases cause millions of deaths; and in many regions, corruption is widespread and stands in the way of well-intentioned programs reaching their intended beneficiaries. Telephone connectivity in India is about 3% and will not rise much above that level unless the cost of connections (the so called 'last mile' cost) can be lowered.

The obstacles are economic, as Ashok Jhunjhunwala notes in this volume: not much more than 3% of the Indian population can afford to pay the real costs of a new telephone line. This group is, by definition, the most affluent group in India, concentrated in the major cities where connections are most widely available. Despite the success of PCO/STD/ISD booths (manned pay phones) in cities and villages, and despite repeated government promises to provide telephone connections to all of India's 700,000 villages, many Indian villages remain without any. As a result, most rural Indians have never made a telephone call. In short, there can be no doubt of a massive digital divide in India based on income, related to education and urban residence, and correlated with economic, political and cultural power.

A second digital divide, less often noted, is linguistic and cultural. In many nations this divide separates those who speak English or another West European language from those who do not. But even in the United States, where well over 95% of all inhabitants speak fluent English, there are large differences in access to ICTs among different ethnic and cultural groups. For example, in 1998, Asian American households (largely of South Asian or South Pacific Asian extraction) had 55% computer ownership, white Americans had 52%, while Americans of Hispanic origin had 25% and blacks 23% respectively. An even larger gap separated Asian Americans and whites from blacks and Hispanics with regard to Internet access.

It might be argued that these differences in the U.S. are the simple corollary of the income disparities between Americans of European or Asian origin and Americans of African or Hispanic origin. This inference is only correct in part. For example among American households with annual incomes below $35,000 (below the median), in 1998, Internet access among white and Asian American families was more than three times greater than among black or Hispanic families. Similarly, among college students, 80% of white students but only 40% of black students had Internet access.

I know of no study that examines the 'culture' of American Web sites; but few sites in the U.S. specifically address the interests, concerns or assumptions of African Americans or Hispanic Americans, while most take for granted the prevailing outlook of the dominant, English-speaking 'Anglo-Saxon' culture.

These cultural disparities, dramatic in the US, are far more notable in India, where they are compounded by linguistic issues. An estimated 60-80% of all Web sites in the world are in English while almost all the rest are in one of the major 'Northern' languages like Japanese, German, French, Spanish, Portuguese, and increasingly Chinese. But in India, like the rest of South Asia, only an estimated 2-10% of the population speaks fluent English while the rest (more than 900 million Indians and about 1.2 billion South Asians) speak other languages.

For Indians who speak no (or little) English, the barriers to the Information Age are almost insuperable. All widely-used

operating systems require some knowledge of English or one of the 'Northern' languages. Thus, in practice, unless Indians know English, which most Indians do not, no matter how wealthy, brilliant, educated, prosperous or motivated they may be, computer use and Internet access are effectively out of the question. The result is a self-confirming prophecy: since there is so little software in any language other than English, virtually everyone in South Asia who uses computers knows English. Therefore, software 7 manufacturers can argue – not incorrectly – that 'there is no market' for Indian language software.

Of course the 50 or so million Indians who speak fluent English by no means constitute a representative sample of the Indian population: they again tend to be prosperous, urban, highly educated, concentrated in technical fields.

They are, in a word, members of the Indian elite, where English is the lingua franca. For the great majority of Indians, however, computers are linguistically inaccessible and therefore useless. As Professor Vijay Chandru of the Indian Institute of Science commented, half seriously, at the 1998 conference BangaloreIT.com, 'The reason Indians don't have computers is because they are so smart. What can the average Indian do with a computer?'

To linguistic inaccessibility in India is added the absence of culturally relevant content. The number of Web sites in 2000 in India is small in any case, but the number of sites in Indian languages is miniscule. To be sure, a few gifted programmers are attempting to change this, and sites are beginning to appear in languages with vast populations of mother tongue speakers like Hindi, Bengali or Tamil. But to all intents and purposes, the many, ancient, rich, and sophisticated cultures that make up India remain almost invisible on the Web. And absent good, low-cost Indian language software, the technical challenges of producing a Website in Telegu, Tamil or Hindi guarantee that these cultures will remain almost invisible. What is remarkable is that a handful of dedicated Indian programmers have actually begun to overcome these challenges.

In short, related to the digital divide that springs from wealth and power is a second divide related to the dominance of the

English language and of what is loosely called 'Anglo- 8 Saxon culture.' Most Web sites in the world originate in the United States, in predominantly English-speaking nations like Great Britain, Canada, Australia and New Zealand, or in the English-speaking populations of nations and city-states like India, South Africa, Singapore, and Hong Kong. A few writers have spoken of "American cultural imperialism" on the Internet; a less tendentious phrase would be "Anglo-Saxon linguistic and cultural hegemony."

The third digital divide follows inevitably from the first two -- it is the growing digital gap between the rich and the poor nations. The 1999 United Nations Report on Human Development devotes much of a chapter to the widening gap between the information-rich nations of the North and the information-poor nations of the South. At one extreme are the United States and the 'Nordic' countries like Sweden, Germany, Finland, and Iceland, where household telephone connectivity is well over 90%, computer saturation is over 50%, and homebased Internet connectivity averages over 50%. At the other extreme lies most of Africa, most of South America, South Asia, China, Indonesia, and so on -- the 80% of the world where telephone connectivity is 3% or less (less than 30 million/1 billion in India), home computer ownership is 1 - 2% and Internet connectivity less than half of that.

The reason why the digital divide between nations is increasing seems clear. If widespread access to ICTs gives a nation an advantage, and lack of access leaves it at a disadvantage, then the maxim, "To those who have shall be given" applies with special force to the international digital divide. The international disparity in access to ICTs is of course an aspect of – indeed a reflection of – other disparities between rich and poor nations. But insofar as ICTs are themselves enabling, facilitating, and wealth-creating, the international divide in information technology widens the already great gulf between North and South. 9

To these three digital divides we can add, in countries like India and America, yet a fourth: the emergence of a new elite group, which can be called the "digerati." By "digerati" I mean the beneficiaries of the enormous successful information technology

industry and the other knowledge-based sectors of the economy such as biotechnology and pharmacology. Time and again in India, for example, brilliant graduates of Indian Institutes of Technology or major engineering colleges and universities who chose to concentrate in the natural sciences, mechanical engineering or chemical engineering comment that their equally gifted classmates who entered computer science or biotechnology are now earning many times their incomes and living in an altogether different way.

Unlike older Indian elites, the privileges of the new digerati are based not on caste, inherited wealth, family connections or access to traditional rulers, but on a combination of education, brainpower, special entrepreneurial skills and ability to stay on the "cutting edge" of knowledge. The lifestyle of the digerati tends to be cosmopolitan: they provide the clientele for the boutiques, the coffeehouses, the travel agencies, the pubs, and the international airways that whisk them to vacations or assignments in Singapore, London, Zurich, Mauritius, San Jose or Kathmandhu.

On the outskirts of Chennai, Poona, Bangalore, Mumbai, Delhi, and Hyderabad luxury apartments are rising to house this new group. Although initially concentrated in information technology, this new digerati are also found, to varying degrees, in the biotech, pharmaceutical and other high-tech areas. In India, their salaries are still relatively low by Western standards, but, with annual salary growth rates of over 20% for the last five or ten years, far above those of their otherwise equally educated classmates in India.

In America a similar phenomenon is visible in areas like Silicon Valley, Austin TX, the Research Triangle of North Carolina, and a dozen other "high-tech" areas. Before the market 10 correction of "Dot-com" stocks in 2000, it was said that in Silicon Valley, 64 people became millionaires every day. The world of high-level programmers, systems analysts, entrepreneurs, and venture capitalists has a culture, a life style, and a level of affluence that distinguishes itself from older American elites. Annalee Saxenian's paper in this volume suggests that a similar culture may be emerging with a distinctive Indian flavor in cities like Bangalore. The emerging digerati are to be found not

only in nations like India and the U.S., but in Israel, Ireland, Taiwan, and other countries or city states with vibrant information industries.

Of the prosperity of these elite there can be no doubt; similarly, there is little doubt that given worldwide labor shortages in the information technology industry, this prosperity will continue and increase.

The critical question about the fourth digital divide, however, is whether the prosperity of these new digital elite spreads to the rest of society, especially to urban poor and to rural villagers, or whether it creates an increasingly separate, cosmopolitan, knowledge-based enclave.

In India, in the immediate surround of the IT industry in cities like Bangalore, there are of course visible ancillary benefits to workers in supporting industries: to the builders of the new apartment buildings, the employees of the boutiques, coffee houses, and shops, the owners of the travel agencies the digerati patronize, and the drivers and servants whom they employ. But it is a long way from these IT-related enterprises to life in rural villages less than 100 km. away. Similarly, whether the newly-minted millionaires of Silicon Valley of the American IT industry will improve the conditions of life of the laborers who actually make the computer chips on which the millionaires' prosperity is partly based is a moot question. In neither country has a systematic effort been made to share the wealth generated by the digital revolution.

The point is that "the digital divide" is really at least four divides, all closely related. The first is internal, between the digitally empowered rich and the poor. This gap exists in both the 11 North as well as the South, although the baselines differ. The second linguistic-cultural gap is largely between English and other languages, or more generally, between "Anglo-Saxon culture" and other world cultures. The third is the gap exacerbated by disparities in access to information technology between rich and poor nations. Finally, there is the emergent intra-national phenomenon of the "digerati", an affluent elite characterized by skills appropriate to information-based industries and technologies, by growing affluence and influence unrelated to the traditional sources of elite status, and

by obsessive focus, especially among young people, on cutting edge technologies, disregard for convention and authority, and indifference to the values of traditional hierarchies.

Can ICTs Help Bridge the Digital Divide?

Weiner's response underlines the most important question for India, for America, and for the world about information and communication technologies and the digital divide. When hundreds of millions of people lack basic education, essential health care, adequate nutrition, or simple justice, how can investment in ICTs be justified? When resources are limited (as in fact they always are) should they not be allocated to meeting more "fundamental" needs like 12 nutrition, health care, education, and the effort to provide a non-corrupt system of governance and law?

In developed countries like the United States as in developing countries like India, there are huge reservoirs of unmet basic human needs. In America, tens of millions lack basic health insurance and almost 20% of all children live in officially defined "poverty"; in India, hundreds of millions go to bed hungry every night. In every nation, energy and resources committed to the deployment of ICTs among the poor and/or non-English speaking might alternately (and perhaps more constructively) be used for food, health, housing, literacy, and other more critical needs.

Admittedly, in the first years of the twenty-first century, ICTs have become glamorous, interesting, and fashionable. The "digital divide" is the subject of almost daily reports and conferences by international agencies, national and local governments, NGO's, and private foundations. But since when have desperately poor people had an urgent 'need' for a computer 13 or an Internet connection? How can we reconcile major commitments of energy and funds to ICTs when more basic human needs remain unfulfilled?

The conventional, even formulaic, answer to the alleged conflict between investment in ICTs and investment in meeting basic human needs is, "We need to do both. There is no contradiction between ICTs and other critical human and social goals." But this formula, however frequently invoked, needs to be examined

critically. A beginning is to rephrase the question. Many discussions appear to assume that extending ICTs to larger segments of the population is good in itself. They speak of "digital empowerment", of a "computer savvy" generation, or of a "Web-enabled" society. But further questioning almost always reveals that ICTs are invariably seen as instrumental in meeting other human needs: needs for food and a job, business needs, medical needs, needs for export earnings, needs for useful information, needs for transparency of government, and so on. A beginning of wisdom thus requires recognizing that ICTs are rarely goods in themselves but rather instruments in the pursuit of other goals. People have lived well, wisely, healthily, hopefully, happily, and generously for millennia without ICTs; they still do. If ICTs are useful at all, it is as a potential instrument in meeting other human, social, cultural, economic or political purposes.

If the problem is thus re-defined, the question, 'How can ICTs being extended to larger segments of the population?' is transformed into, 'How, if at all, can ICTs be used to ensure the fulfillment of essential human needs and to further basic human rights?' In this formulation, the qualifier 'if at all' is essential. It allows the possibility, for example, that the answer to Professor Weiner's and Professor Bhatnagar's question may be that available resources should better be used to build schools and hire teachers rather than supply a limited number of urban or rural 14 schools with computers and Internet connections. Or, to be more precise, it suggests that ICTs should be deployed in education if and only if they are the most effective way of extending quality education to larger segments of children and adults.

Lessons from India

The Workshop on "Equity, Diversity, and Information Technology", held at the National Institute of Advanced Studies at the Indian Institute of Science in Bangalore, was an effort to address the several digital divides. Bringing together thirty activists, professionals, and scholars, largely from India, the two-day meeting was preceded by the distribution of almost one thousand pages of materials on the digital divide and Indian ICT projects, and by papers

or outlines by the participants. No attempt was made to reach an explicit consensus or to produce a manifesto: the papers collected in this volume reflect the range of perspectives and views represented at the meeting. But from the preparations for the Workshop, from two days of intensive presentations, debate, and discussion, and from correspondence following the Workshop, a number of lessons can be drawn.

1. Information technologies should be introduced when (and only when) they constitute the most effective available way of meeting basic human needs and fulfilling fundamental human rights
2. The most creative uses of ICT's in development may not entail computers, e-mail, or Internet access, but rather the use of other computer-based technologies, including embedded chips, satellite based information, etc. in order better to meet local needs.
3. ICT projects must build on an assessment of local needs, as locally defined by local people.
4. Local language and local content are essential.
5. Projects must be (or soon become) economically self-sustaining.
6. Beware of inflated rhetoric and grandiose plans: look for results.
7. Do not simply assume that a flourishing IT sector will trickle down to the rest of the people.
8. Be sure that ICT programs actually really reach and benefit their intended beneficiaries.
9. ICT for development efforts need to share experiences within and between nations, especially about actual successes and failures at the grass roots level.
10. The voices and interests of the disadvantaged need to be represented in bodies that make ICT policy concerning regulation and infrastructure.

<div align="center">**Chapter V**</div>

CYBER LAW AND E – GOVERNACE

WHAT IS CYBER LAW?

      Cyber Law is the law governing cyber space. Cyber space is a very wide term and includes computers, networks, software, data storage devices, the Internet, websites, emails and even electronic devices such as cell phones, ATM machines etc.

Law includes the rules of conduct:

     • That have been approved by the government, and

     • Which are in force over a certain territory, and

     • This must be obeyed by all persons on that territory. Infringement of these rules could lead to government action such as imprisonment or fine or an order to pay compensation.

Cyber law includes laws relating to:

     • Cyber Crimes

     • Electronic and Digital Signatures

     • Intellectual Property

     • Data Protection and Privacy

      Cyber-crimes are unlawful acts where the computer is used either as a tool or a target or both. The huge growth in electronic commerce (e-commerce) and online share trading has led to an unusual spurt in incidents of cyber-crime.

      Electronic signatures are used to authenticate electronic records. Digital signatures are one type of electronic signature. Digital signatures satisfy three major legal requirements – signer authentication, message authentication and message integrity. The technology and efficiency of digital signatures makes them more trustworthy than hand written signatures.

Intellectual property is refers to creations of the human mind e.g. a story, a song, a painting, a design etc. The facets of intellectual property that relate to cyber space are covered by cyber law. These include:

     • Copyright law in relation to computer software, computer source code, websites, cell phone content etc,

     • Software and source code licences

• Trademark law with relation to domain names, meta tags, mirroring, framing, linking etc

• Semiconductor law which relates to the protection of semiconductor integrated circuits design and layouts,

• Patent law in relation to computer hardware and software. Data protection and privacy laws aim to achieve a fair balance between the privacy rights of the individual and the interests of data controllers such as banks, hospitals, email service providers etc

These laws seek to address the challenges to privacy caused by collecting, storing and transmitting data using new technologies [5-8].

NEED FOR CYBER LAW

There are various reasons why it is extremely difficult for conventional law to deal with cyberspace. Some of these are as follows:

➢ Cyberspace is an intangible dimension that is impossible to govern and regulate using conventional law.

➢ Cyberspace has complete disrespect for jurisdictional boundaries.

➢ Cyberspace handles gigantic traffic volumes every second. Millions of websites are being accessed every minute and billions of dollars are electronically transferred around the world by banks every day.

➢ Cyberspace is absolutely open to participation by all.

➢ Cyberspace offers never-seen-before economic efficiency. Billions of dollars' worth of software can be traded over the Internet without the need for any government licenses, shipping and handling charges and without paying any customs duty.

➢ Electronic information has become the main object of cyber-crime. It is characterized by extreme mobility, which exceeds by far the mobility of persons, goods or other services. International computer networks can transfer huge amounts of data around the globe in a matter of seconds.

➢ A software source code worth crores of rupees or a movie can be pirated across the globe within hours of their release.

> Theft of corporeal information (e.g. books, papers, CD ROMs, floppy disks) is easily covered by traditional penal provisions. However, the problem begins when electronic records are copied quickly, unnoticeably and often via telecommunication facilities. Here the "original" information, so to say, remains in the "possession" of the "owner" and yet information gets stolen.

TECHNICAL ASPECTS

Technological advancements have created new possibilities for criminal activity, in particular the criminal misuse of information technologies such as

Unauthorized access & Hacking: - Access means gaining entry into, instructing or communicating with the logical, arithmetical, or memory function resources of a computer system or computer network. Unauthorized access would therefore mean any kind of access without the permission of either the rightful owner or the person in charge of a computer system network. Every act committed towards breaking into a computer or network is hacking. Hackers write or use readymade computer programs to attack the target computer. Some hackers hack for personal monetary gains. By hacking web server taking control on another person's website called as web hijacking.

Trojan Attack: - The program that acts like something useful but do the things that are quiet damping. The programs of this king are called as Trojans. The name Trojan Horse is popular. Trojans come in two parts, a Client part and a Server part. When the victim (unknowingly) runs the server on its machine, the attacker will then use the Client to connect to the Server and start using the Trojan.

Virus and Worm attack: - A program that has capability to infect other programs and make copies of it and spread into other programs is called virus. Programs that multiply like viruses but spread from computer to computer are called as worms.

E- Mail & IRC related crimes: -
> Email spoofing: Email spoofing refers to email that appears to have been originated from one source when it was actually sent from another source.

> ➤ Email Spamming: Email "spamming" refers to sending email to thousands of users - similar to a chain letter. Sending malicious codes through email E- mails are used to send viruses, Trojans etc through emails as an attachment or by sending a link of website which on visiting downloads malicious code.

Denial of Service attacks: - Flooding a computer resource with more requests than it can handle. This cases the resource to crash thereby denying access of service to authorized users. Confidentiality it means non-disclosure of information to unauthorized or unwanted persons. In addition to Personal information some other type of information which useful for business and leakage of such information to other persons may cause damage to business or person. Such information should be protected

CYBER LEGISLATIONS WORLDWIDE

To meet the challenge posed by new kinds of crime made possible by computer technology including telecommunication, many countries have also reviewed their respective domestic criminal laws so as to prevent computer related crimes. Some of these countries are USA, Austria, Denmark, France Germany, Greece, Finland, Italy, Turkey, Sweden, Switzerland, Australia, Canada, India, Japan, Spain, Portugal, UK, Malaysia and Singapore

However, no country has fully resolved all the issues such as legal, enforcement and prevention of crime. The legislations enacted by different countries cover only few of the classified computers related offences. However, looking to the dynamic and fast changing technology, new types of offences may pop-up frequently. Some of the major types of offences against which many countries across the globe have enacted various Acts are as follows: -

> ➤ Unlawful access to data in computers,
> ➤ Damaging data in computer etc.
> ➤ Possession of device to obtain unauthorized telephone facilities,
> ➤ Unauthorized access to computer and computer material
> ➤ Committing mischief with data.
> ➤ Data spying,

- Computer fraud,
- Forgery of prohibitive data,
- Alteration of data,
- Computer sabotage.
- False entry in an authentic deed
- False entry in permit license or passport
- Electronic record made wrongfully
- Electronic record made wrongfully by public servant
- Interferences with business by destruction or damage of computer
- Interferences with computer
- Destruction of public document
- Destruction of private document
- Unauthorized access with intention to commit offences/ computer crimes
- Unauthorized use and interception of computer services
- Knowingly access of computer without authorization related to national defence or foreign relation
- Intentional access of computer without authorization to obtain financial information
- Unauthorized access of computer of a Govt. Department Or agency
- Knowingly causing transmission of data/program to damage a computer network, data or program or withhold or deny use of computer, network etc.
- Knowingly causing transmission of data/program with risk that transmission will damage a computer network, data or program or withhold or deny use of computer, network etc, anunauthorized access of computer with intent to defraud.

ADVANTAGES OF CYBER LAWS

The IT Act 2000 attempts to change outdated laws and provides ways to deal with cybercrimes. We need such laws so that people can perform purchase transactions over the Net through credit cards without fear of misuse. The Act offers the much needed legal framework so that information is not denied legal effect. Validity or enforceability, Solely on the ground that it is in the form of

electronic records. In view of the growth in transactions and communications carried out through electronic records. The Act seeks to empower government departments to accept filing.

Creating and retention of official documents in the digital format,the Act had also proposed a legal framework for the authentication and origin of electronic records/ communications through digital signature. Firstly, the implications of these provisions for the e- businesses would be that email would now be a valid and legal form of communication in our country that can be duly produced and approved in a court of law. Companies shall now be able to carry out electronic commerce using the legal infrastructure provided by the Act. The Act throws open the doors for the entry of corporate companies in the business of being Certifying Authorities for issuing Digital Signatures Certificates.

The Act now allows Government to issue notification on the web thus heralding with any office. Authority, body or agency owned or controlled by the appropriate Government in electronic form by means of such electronic form as may be prescribed by the appropriate Government. The IT Act also addresses the important issues of security to the concept of secure digital signatures that would be required to have been passed through a system of a security procedure, as stipulated by the Government at a later date.

E-GOVERNANCE AND CYBER LAW

E-Governance has two dimensions. The first is the application of Information Technology for the improvement of Administration. Second is application of Governance to the emerging Cyber Society.

Even though, the concept of E-Governance (EG) is, in principle applicable to all types of Governance including Corporate Governance, the present discussion is focused on traditional responsibilities of a Politically elected body (Government) entrusted with the administration of a society (Citizens).

This system of Governance consists of the Ministry and the Parliamentary /State Legislative systems, down to the elected representatives of the Village Panchayat (in India). It also includes the implementation machinery consisting of the Officials and any

other organizations involved in the delivery of collective state administered services to the Citizens.

The essence of EG is the Communication between the "Governing" and the "Governed" and the test of "Good Governance" is a "Harmoniously Living Society". The system of EG is supported by five major pillars viz.;

➢ Computers
➢ Connectivity
➢ Content
➢ Consumer/s
➢ Confidence Building

"Computers" in this context refers to all the hardware and software requirements of Governance.

"Connectivity" refers to all the information carrier systems, bandwidth etc.

"Content" refers to the information that is exchanged between the "Consumers" of the system.

"Consumers" refers to all the human and human substitute systems that access and use the "Content" in the EG system.

"Confidence Building" refers to such of those measures that helps the Citizens develop a confidence in the E-Governance and encourages them to take to the E-Transformation. It is in this context that "Law" has a part to play along with "Education".

The Concept of Cyber Society:

One of the key features in E- Government is to recognize that it includes an attempt to govern the component of the society, which is accessible through the "Cyber System".

It therefore covers the "Cyber Society" within the "General Society". At the same time E-Governance also attempts to regulate the Cyber Society itself because the person and property of a Citizen are controlled by the Government.

Most of the Conflicts and Issues in E-Governance arise because of the inability to accept the existence of two different societies with overlapping jurisdiction.

While one of the pre-requisites of a functional EG is to ensure a deep penetration of E- Governmentat least beyond a minimum

acceptable critical level, at any point of time it has to deal with a mixed society which consists of;

1. The "Cyber Society"
2. "Non-Cyber Society"
3. Adhoc Users of the EG system who have not evolved into the "Cyber Society"

The "Cyber Society" consists of those who have adopted the "Cyber Usage" to a substantial extent. They have a culture of their own. They own Cyber property and participate in E-Commerce. This Cyber Society has its own "Boundaries" even though they are not bound by the boundaries of the geographical world. Such boundaries may be defined by various technology parameters. One example of such a boundary can be "Digital Identity". Similarly, A gaming zone that requires a minimum of 128 MB RAM can be considered bound by the minimum hardware barrier.

The members of the Cyber Society namely the Netizens have their "Rights" such the as the "Right to Exist in Peace", "Right to Freedom of Speech", "Right to enter into legally enforceable Digital Contracts", "Right to own and maintain Cyber Properties"," Right to carry on Online Business or Professional Practice" etc. The State may have the right to "Taxation" provided it is providing any "Community Services" such as "Cyber Policing", "Cyber Judiciary", etc.

If the Government has to ensure "Harmonious living" in a society which may consist of disparate interacting elements, there is a need for some "Norms" acceptable to the society which will be complied with voluntarily by a majority of the members. It is in the exception of cases when a member of the society transgresses the "Norm" that we say that a "Crime" has been committed and invoke the "Police" and "Judiciary". Ideally, a commonly accepted set of "Norms" evolves into the "Law" for the society after they are codified into the statutory books.

Thus, "Cyber Laws" have an important role in representing and defining the norms of the "Cyber Society" that the system of EG tries to administer. If the "Laws" closely match the aspirations of the society, they will be voluntarily complied with by the majority and

even "No Governance" may be "Good Governance". If the "Laws" are arbitrary, they lead to "Exploitation of Loopholes", "Corruption", "Rebellion" and "Terrorism". Then even the "Best Governance" will be "Bad Governance" to a section of the society.

One of the practical challenges in EG is to ensure that the "Cyber Laws" not only satisfy the requirements of the "Cyber Society", but also are acceptable to the "Non Cyber Society" with which it interacts as well as the "Occasional members of the Cyber Society". In a country like India, where the Netizen population is only around 2 Million now (expected to reach 20 Million in the next two years), while the Citizen population is over 1 Billion, the need of managing the "Digital Divide" and its consequences are also important factors in EG. The Cyber Laws have to therefore manage these "Inter Society" issues to the Satisfaction of both the societies.

The Cyber Laws in the Indian Context came into focus with the Information Technology Bill-1999, which has since been passed as Information Technology Act-2000 (ITA-2000). This was the first comprehensive codification of Laws in India directly enacted for the regulation of the Cyber world.

The ITA-2000 was a big step in the direction of introducing Cyber Laws for India. First of all, it provides a legal recognition for Electronic Documents and Digital Signatures as equivalent to the "Written" or "Typed" or "Printed" counterparts. It also sets the framework of procedure and standards for Digital Signatures. It also defines actions that are considered "Cyber Crimes" and suggests punitive measures. Besides, ITA -2000 has also defined the judicial system for trying and awarding punishments for Cyber Crimes.

In addition to the above, in the field of "Government-Citizen" (G2C) relationship management, the following three sections of the ITA-2000 directly address the requirements of G2C (Government to Citizen) relationship management.

1) **Where any law provides for**the filing of any form, application or any other document with any office, authority, body or agency owned or controlled by the appropriate Government in particular manner; the issue or grant of any license, permit, sanction or approval by whatever name called in a particular manner; the

receipt or payment of money in a particular manner, then, notwithstanding anything contained in any other law for the time being in force, such requirement shall be deemed to have been satisfied if such filing, issue, grant, receipt or payment, as the case may be, is effected by means of such electronic form as may be prescribed by the appropriate Government.

2) **The appropriate Government may, for the purposes of sub-section**by rules, prescribe - the manner and format in which such electronic records shall be filed, created or issued; the manner or method of payment of any fee or charges for filing, creation or issue any electronic record under clause

Where any law provides that documents, records or information shall be retained for any specific period, then, that requirement shall be deemed to have been satisfied if such documents, records or information are retained in the electronic form,- the information contained therein remains accessible so as to be usable for a subsequent reference; the electronic record is retained in the format in which it was originally generated, sent or received or in a format which can be demonstrated to represent accurately the information originally generated, sent or received; the details which will facilitate the identification of the origin, destination, date and time of dispatch or receipt of such electronic record are available in the electronic record: Provided that, this clause does not apply to any information, which is automatically generated solely for the purpose of enabling an electronic record to be dispatched or received.

Nothing in this section shall apply to any law that expressly provides for the retention of documents, records or information in the form of electronic records, Publication of rules, regulation, etc. in Electronic Gazette.

Publication of rules, regulation, etc, in Electronic Gazette:

Where any law provides that any rule, regulation, order, bye-law, notification or any other matter shall be published in the Official Gazette, then, such requirement shall be deemed to have been

satisfied if such rule, regulation, order, bye-law, notification or any other matter is published in the Official Gazette or Electronic Gazette:

Provided that, where any rule, regulation, order, bye-law, notification or any other matters published in the Official Gazette or Electronic Gazette, the date of publication shall be deemed to be the date of the Gazette which was first published in any form.

The above provisions provide a good framework for the Government departments to adopt E-Governance practices if they desire. However, there are some noticeable shortcomings in the ITA-2000 a detailed discussion of which is beyond the scope of this note. In addition, several aspects of Cyber Laws are being additionally introduced through Telecom Regulatory guidelines, the proposed Communication Bill etc., the impact of these "Back door laws" needs to be assessed carefully for their impact on the Cyber Society.

The shortcomings observed so far in the regulations indicate that the Netizens need to closely monitor provisions, which may be misused during the E- Government process by various functionaries of the Government including the Police and the Regulatory Officers. There are several Ambiguities, Loopholes, besides Creation of New Power centers, Lack of Accountability, Over Regulation and Genuine Mistakes in the legislation. Any or all of them may lead to harassment of honest Netizens and continuance of inefficient and corrupt Governance.

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We must consider ourselves to be fortunate that we are in a position to interact with the Legislators and record our comments when the "Constitutional provisions for the Governance of the E-

Society", in which all of us have a stake, are being formulated. Let's make full use of this opportunity, as otherwise, we will be abdicating our "Right to Good E-Governance"

LEGAL STATUS FOR DIGITAL TRANSACTIONS

The Electronic Transactions Act (ETA) (Cap 88) was first enacted in July 1998 to provide a legal foundation for electronic signatures, and to give predictability and certainty to contracts formed electronically. In July 2010, the ETA was repealed and re-enacted to provide for the continuing security and use of electronic transactions.

Singapore was one of the first countries in the world to enact a law that addresses issues that arise in the context of electronic contracts and digital signatures, and continues this trend by being amongst the first to implement the United Nations Convention on the Use of Electronic Communications in International Contracts, adopted by the General Assembly of the United Nations on 23rd November 2005 (the UN Convention). The Electronic Transactions Bill was introduced in Parliament on 26 April 2010, and passed on 19 May 2010. The re-enacted Act came into force on 1 July 2010.

The Singapore ETA follows closely the UN Convention, which is an update to the UNCITRAL Model Law on Electronic Commerce, to better fit the current Internet environment. The UN Convention sets a new global standard for national electronic commerce legislation.

The ETA addresses the following issues:

1. Commercial code for e-commerce transactions: The ETA was enacted to create a predictable legal environment for e-commerce. It clearly defines the rights and obligations of the transacting parties. It also addresses the legal aspects of electronic contracts, use of specified security procedures (including digital signatures) and concerns for authentication and non-repudiation.

2. Use of electronic applications for public sector: In order to facilitate the use of electronic transactions in the public sector,

the ETA contains an omnibus provision through which government departments and statutory boards can accept electronic filings and electronic versions of documents without having to amend their respective Acts. It also allows public bodies to issue permits and licences electronically.

3. Liability of network service providers: Singapore recognises the importance of network service providers in providing information infrastructure and content. The government also realizes that it is impractical for network service providers to check all the content for which they merely provide access. To create a transparent legal environment conducive to the growth of network service providers, the ETA specifies that network service providers will not be subject to criminal or civil liability for such third-party material, in relation to which they are merely the host. The clause, however, will not affect the obligations of a network service provider under any licensing or other regulatory regime established under the law.

4. Provision for the development of security procedures such as Public Key Infrastructure (PKI) and biometrics: the ETA provides for the appointment of a Controller to enable regulations to be made for the licensing and accreditation of specified security procedure providers, such as certification authorities (CAs), and including recognition of foreign CAs.

The Evidence Act (Cap 97) was also amended in 1997 to allow the use of electronic records as evidence in the courts.

INFORMATION TECHNOLOGY

Information technology refers to the study and development of a support-management based, computerized information system. The development is mainly observed in the form of dedicated software applications and a number of hardware programs. The advantages of IT include work place cost-effectiveness and essential globalization.

Information Technology or IT mainly deals with computer applications. The common work environment today is totally dependent on computers. This has led to the need to develop and consistently upgrade dedicated computer software like project

management software, for a number of related requirements. These include storage and protection of content, processing and transmitting of dedicated information and the secured retrieval of information, when and as required. IT promotes computing technology, covering everything from installing applications to developing databases.

Information technology (IT) is a technology which uses computers to gather, process, store, protect, and transfer information. Today, it is common to use the term Information and communications technology (ICT) because it is unimaginable to work on a computer which is not connected to the network. The computer consists of:

- ➢ hardware – physical computer parts, palpable and visible
- ➢ Software – set of commands that are "understandable" to the computer; instructions to its palpable parts, giving orders what to do Basic principle of computers: Data enters the computer through one or more input devices. The computer then processes the data and transmits the resulting data to output devices. Output devices can be human interfaces such as a screen or another electronic device such as a storage device or computer network.

The system unit consists of the following components:

- ➢ **Motherboard - MBO**
    - a computer "backbone" responsible for communication between components and transmission of information
- ➢ Central Processing Unit - CPU
    - functions: command execution, data transmission, computer function control
- ➢ basic characteristics:
    - speed (in Mega Hertz (MHz), Giga Hertz (GHz))
    - amount of memory (Cache in Bytes)
- ➢ **Random Access Memory - RAM**
    - a memory container for programs that are currently running and data that is being processed
- ➢ basic characteristics:
    - speed (in MHz, GHz)

- capacity (in Bytes)
- data rate class (DDR SDRAM, SDR SDRAM)

➢ **Permanent Memory:**
- Hard Disk Drive - HDD - device (memory) used for permanent data storage
- data is stored on magnetic platters; electromagnetic heads are used for reading and recording data with the exception of the newest disk types called Solid State Drive (SSD)

➢ basic characteristics:
- disk platters rotation speed (in RPM)
- capacity (in GB)
- connection interface (IDE, SATA)
- Floppy Disk Drive - FDD
- optical disks - CD, DVD

Information Technology (**IT**)

Information Technology is the application of computers to store, retrieve, transmit and manipulate data, or information, often in the context of a business or other enterprise. IT is considered to be a subset of information and communications technology (ICT). In 2012, Zuppo proposed an ICT hierarchy where each hierarchy level "contain[s] some degree of commonality in that they are related to technologies that facilitate the transfer of information and various types of electronically mediated communications".

The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Several industries are associated with information technology, including computer hardware, software, electronics, semiconductors, internet, telecom equipment, and e-commerce.

Electronic data processing involves data storage, databases, data retrieval, data transmission, data manipulation.

Ethical Perspective

The field of information ethics was established by mathematician Norbert Wiener in the 1940s.Some of the ethical issues associated with the use of information technology include:

- Breaches of copyright by those downloading files stored without the permission of the copyright holders
- Employers monitoring their employees' emails and other Internet usage
- Unsolicited emails
- Hackers accessing online databases
- Web sites installing cookies or spyware to monitor a user's online activities

Why is Information Technology Important?

All our work related applications are now completely automated, thanks to the IT sector. IT professionals are people involved in essential management of sensitive data, exclusive computer networking and systems-engineering. The advancement of the IT sector has resulted in automated:

➢ Administration of entire systems.
➢ Production and manipulation of sensitive information.
➢ Cultural development and communication.
➢ Streamlining of business processes and timely upgrades.

Advantages

Globalization

True globalization has come about only via this automated system. The creation of one interdependent system helps us to share information and end linguistic barriers across the continents. The collapse of geographic boundaries has made the world a 'global village'. The technology has not only made communication cheaper, but also possible much quicker and round the clock. The wonders of text messages, email and auto-response, backed by computer security applications, have opened up scope for direct communication.

Cost-effective

Computerized, internet business processes have made many businesses turn to the Internet for increased productivity, greater profitability, clutter free working conditions and global clientele. It is mainly due to the IT industry that business has been able to make their processes more streamlined, thereby becoming more cost-effective and consequently more profitable. People are

able to operate their businesses 24x7, even from remote locations only due to the advent of information technology.

Communication

Quick and effective communication is vital to any business anywhere in the world. Information technology gives an entrepreneur or business the tools, like email, video conferencing, SMS, etc., essential to communicate efficiently and effectively. to the business world, and information technology gives your company the resources it needs to communicate quickly and effectively. Not only do people connect faster with the help of information technology, but they are also able to identify like-minded individuals and extend help, while strengthening ties.

Storing and Protecting Information

IT provides a low-cost business options to store and maintain information that may be important from a business or service point of view. Virtual vaults and other such security systems not only store vital data but also allow control over the access to such information. IT security systems will also protect virtual data from being hacked or wiped out in case of any technical-failure.

Creation of New Jobs

One of the biggest advantages of IT has been the creation of a whole new field of opportunity for skilled personnel leading to new and interesting jobs. Hardware and software developers, computer programmers, web designers, system analyst, the list of new jobs created could go on. IT has also been attributed to be the major cause of surge in the economies of certain Third World nations too.

Things that were once done manually or by hand have now become easier and faster due to the advent of a computing technology. Our world today has changed a great deal with the aid of IT which has penetrated almost every aspect of our daily lives and society, from leisure to business. IT has become a part of our day-to-day lives through the evident use of PC's, Internet, cell phones, faxes, the list would seem endless.

Let us hope that newer development in the field of IT can provide benefits to our future generations, just as it has greatly

benefited   ours.
PROBLEM DOMAINS

Within the area of long-time preservation of electronic information there are many different problems remaining to be solved. The problems concern technical issues but also organizational and legal issues. Karjalainen has in their study found that Enterprise Document Management systems can be seen as a comprehensive framework for managing information resources, including both human and technological systems in a holistic way. This view covers organizational and legal issues as well as the technological challenges.

Technical problems

Issues at stake in this domain are of a variety of types, covering hardware, software and formats. The large amount of electronic records, which require to be stored for active use, in turn demands new mass storage media. Another problem is the fragility of the media which leads to low durability. There is often also a lack of knowledge concerning the durability of different media for storage. In addition, poor security exists for many electronic files [Wilson, 2000].

The software problem concerns the rapid development of new versions of the software product and occasionally changeovers to new software products. In addition, the software is not always appropriate for the purpose. Guercio [2000] writes that the technology industry ignores archive requirements. She claims that for years' vendors have sold public administrations products that are not really useful.

Many software systems do not handle different versions of data or do not encourage storage of different versions. Dollar [1992] states that a major archival problem concerning most geographic information systems applications is the general practice of updating maps electronically without saving previous versions.

Connected to the problem of rapidly changing software, is the additional problem of changing formats, the consequence of which in the long run can be that archival information become unreadable [Gibbs and Heazlewood, 1999].

The archivists have used different strategies for the technical refreshment of digital information. The strategies:

- ➢ Medium refreshing – copying data from a physical carrier to another physical carrier of the same type
- ➢ Medium conversation – transferring data from one medium to another medium
- ➢ Format conversation – converting the data format
- ➢ Migration of technical environment (hardware and software)
- ➢ Emulation of technical environment – systems which run in a new operating environment but emulate a previous obsolete environment

The available preservations strategies have their strengths and weaknesses. We must be aware of the fact that we have to "choose what to lose" [Rothenberg, 2000]. Until reliable solutions exist, people responsible for archiving will oppose a change from paperbound to electronic [Warner, 2002]. The drawback concerning both migration and emulation is that information can be lost. Repeated migration or emulation increases the risk of loss of information. [Mannerheim, 2000]

Legal issues

The rapidity and ease with which changes can be made means that there are challenges associated with ensuring the continued integrity, authenticity, and provenance of digital materials [Beagrie, 2002]. Several authors emphasize the problem of how to ensure authenticity and how to preserve the evidence

Organizational problems

Most of the challenges associated with digital preservation are organizational – not technical. The first line of defense against loss of valuable digital information rests with the creators, providers, and owners of digital information.

There are many different stakeholders over the lifecycle of digital resources and uncertainties over who should be responsible for preservation activities. At the Erpanet training seminar in Marburg it was stated that: "senior management are not aware of the consequences if their organizations do nothing". Meijer agrees with

this, and states that the consequences of poor electronic management are not well understood.

At the InterPARES symposium Barbedo summarized the results from a Portuguese study which found that agencies have no strategies at all for maintaining continuous access to electronic records. Barbedo argues that records management is not fully recognized as an organizational function. He also claims that there exist organizational andadministrative problems that hinder the implementation of correct record keeping.

Bearman [1994] and Meijer [2001] write about problems of information sharing that make it unclear as to which information belongs to which organization.Many authors claim that there is a lack of collaboration between archivists and IT specialist, "Archives, government organizations and IT solutions providers need to work together to implement sound systems and procedures to maintain authentic records. Archivists also need to broaden their competence.

They have insufficient knowledge concerning information technology [Cox, 2000]. GillilandSwetland [2000] think that there is a need for a new kind of professional, namely one with information technology competence as well as the archivist competence. Wettengel [1996], on the other hand, says that "the archivist should not work with creation; they should remain the keepers of the records". Though the latter view is changing, it is still embraced by several archivists.

Context and Metadata

How is it going to be possible for someone in the future to understand the context of the information and the processes that created it? This is a question of metadata, a question now considered to be of much greater importance in the digital age. How can we determine what amount of evidential historicity is required and how to capture and retain it? "Where should the necessary metadata reside. A document consists of both medium and content. For paperbound documents the paper is the medium. With virtual documents, it is now the metadata which form the real medium.