

Electronic Government for Developing Countries

ICT Applications and Cybersecurity Division
Policies and Strategies Department
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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY.....	5
2. INTRODUCTION.....	9
2.1. CONSTRAINTS TO BUILDING E-GOVERNMENT.....	10
2.2. OUTLINE OF REPORT.....	12
3. BUILDING E-GOVERNMENT SERVICES	15
3.1. WHAT IS E-GOVERNMENT?.....	15
3.2. RATIONALE FOR E-GOVERNMENT	15
3.3. GOALS OF E-GOVERNMENT	15
3.4. TYPES OF E-GOVERNMENT	16
<i>Government-to-Citizen e-Government Approach.....</i>	<i>16</i>
<i>Government-to-Business e-Government Approach.....</i>	<i>17</i>
<i>Government-to-Employee and Government-to-Government e-Government Approaches.....</i>	<i>18</i>
4. ADOPTION PHASES OF E-GOVERNMENT	19
4.1. DESCRIPTIVE ANALYSIS OF E-GOVERNMENT BY COUNTRY.....	24
4.2. THE COMPLEXITY OF E-GOVERNMENT IN DETAIL	25
5. CHALLENGES OF E-GOVERNMENT IMPLEMENTING E-GOVERNMENT – TECHNOLOGICAL ISSUES	27
5.1. DESCRIPTION OF TECHNOLOGIES TO BUILD E-GOVERNMENT.....	28
5.2. CLOSER LOOK AT E-GOVERNMENT FAILURE	30
5.3. OVERCOMING FAILURE THROUGH SYSTEMS DEVELOPMENT APPROACHES.....	30
6. CHALLENGES OF E-GOVERNMENT – UNDERSTANDING THE CITIZEN	33
6.1. PERFORMANCE EXPECTANCY	35
6.2. EFFORT EXPECTANCY	35
6.3. SOCIAL INFLUENCE.....	36
6.4. FACILITATING CONDITIONS.....	36
<i>Enhancing Access to ICTs and the Internet.....</i>	<i>36</i>
<i>Impact of Political and Social Unrest on Individuals.....</i>	<i>37</i>
6.5. GENDER AND E-GOVERNMENT.....	37
7. CASE STUDY – PUBLIC-PRIVATE PARTNERSHIPS FOR E-GOVERNMENT: KEYS TO SUCCESS	41
7.1. PUBLIC-PRIVATE PARTNERSHIP IN ANDHRA PRADESH	41
7.2. LESSONS FROM STUDY OF NEW MODELS OF COLLABORATION FOR E-GOVERNMENT	42
8. CASE STUDY – THE OPPORTUNITY OF GEOGRAPHIC INFORMATION SYSTEMS TO ENHANCE E-GOVERNMENT SERVICES.....	43
8.1. GIS AND E-GOVERNMENT.....	43
8.2. GIS AND E-GOVERNMENT IN DEVELOPING COUNTRIES	43
8.3. GIS-ENABLED E-GOVERNMENT SERVICE IN MALAYSIA	44
8.4. ENTERPRISE-WIDE GIS IN THE SLOVAK REPUBLIC.....	45
8.5. GIS AND E-GOVERNMENT IN SOUTH AFRICA	45
8.6. PARTICIPATORY GIS AND E-GOVERNMENT	45
9. CASE STUDY - ORGANIZATIONAL PERSPECTIVES OF IMPLEMENTING E-GOVERNMENT: LESSON LEARNED FROM SEOUL, REPUBLIC OF KOREA.....	47
9.1. LOCAL AUTONOMY AND E-GOVERNMENT IN SEOUL	47
9.2. THE OPEN SYSTEM.....	47
9.3. E-GOVERNMENT IN GANGNAM-GU	48
9.4. E-GOVERNMENT SERVICES TO STREAMLINE INTERNAL EFFICIENCIES.....	48
9.5. ONLINE PARKING SERVICES IN GANGNAM-GU.....	49

10.	CONCLUSIONS – STRATEGIES TO MAKE E-GOVERNMENT SUCCESSFUL IN DEVELOPING COUNTRIES ..	51
10.1.	KEY LESSONS IN DEVELOPING E-GOVERNMENT SYSTEMS	52
	<i>Lesson 1: Develop a Strategic Plan</i>	52
	<i>Lesson 2: Understand the Needs of the Citizen</i>	53
	<i>Lesson 3: Use Well Established System Development Practices</i>	53
	<i>Lesson 4: Create a Learning Organization</i>	54
	<i>Lesson 5: Develop Effective ICT Governance</i>	54
	<i>Lesson 6: Develop ICT Capabilities</i>	55
	<i>Lesson 7: Provide a Secure Experience for Web Visitors</i>	55
10.2.	CONCLUSION	56
11.	REFERENCES	57

Table of figures

FIGURE 1 - CHARACTERISTICS OF THE EMERGING STAGE OF E-GOVERNMENT	20
FIGURE 2 - CHARACTERISTICS OF THE ENHANCING STAGE OF E-GOVERNMENT	21
FIGURE 3 - CHARACTERISTICS OF THE INTERACTIVE STAGE OF E-GOVERNMENT	22
FIGURE 4 - CHARACTERISTICS OF THE TRANSACTIONAL STAGE OF E-GOVERNMENT	23
FIGURE 5 - CHARACTERISTICS OF THE CONNECTED STAGE OF E-GOVERNMENT.....	24
FIGURE 8 - FEATURES OF INFORMATION AND COMMUNICATION TECHNOLOGIES THAT ENABLE E-GOVERNMENT SERVICES.....	28
FIGURE 9 - E-GOVERNMENT MODEL OF USER BEHAVIOR.....	34
FIGURE 11 - RESULTS FROM WEBSITE EVALUATIONS: 5 MOST COMMON PROBLEMS WITH DEVELOPING COUNTRY E-GOVERNMENT SITES.....	36
FIGURE 12 – NUMBER OF USERS WITH BROADBAND ACCESS PER 100 INHABITANTS	36
FIGURE 13 - USING GIS TO PROVIDE INFORMATION IN MALAYSIA	44
FIGURE 15 - E-GOVERNMENT SECURITY STRATEGY	56

1. EXECUTIVE SUMMARY

The purpose of this report is to examine the adoption of e-Government services in countries with developing economies. The day-to-day business of government is built on information. Information is a critical resource that helps to ensure the accountability of government, enables governments to manage its operations, and allows the public to participate in the governance of their country. With the revolutionary changes that ICTs are bringing to our global society, governments worldwide continue to develop more sophisticated ways to digitize its routines and practices so that they can offer the public access to government services in more effective and efficient ways. Across the world, 173 of 190 countries use the Internet to deliver government services. These activities are broadly referred to as digital government, which is an “umbrella term that comprises all uses of information and telecommunication technologies in the public sector” (Garson p. 18). e-Government focuses on the utilization of information and communication technologies (ICT) to deliver government services. e-Government is part of other closely related efforts in digital government. The term e-governance characterizes efforts to use ICTs for political purposes and the organization of political activity in a country. This report examines e-Government, although some examples could be regarded as e-governance initiatives. The challenges and issues of implementing e-Government systems will also be relevant to implementing ICTs to build systems to support e-governance.

In the midst of this excitement, however, there remains a great disparity and persistent digital divide that constrains the opportunity for countries with developing economies to build and offer e-Government services. Some do better than others. Even though most every country has met the minimal WSIS guidelines for having a website and an e-mail address, Professor West observes from his annual global survey of e-Government (<http://insidepolitics.org/>), “Most governments around the world have gone no further than the billboard or partial service-delivery states of e-Government. They have made little progress at portal development, placing services online, or incorporating interactive features onto their websites. Not only are they failing to use technology to transform the public sector, their efforts mostly consist of no meaningful change or small steps forward” (West 2005 161-162).

The goal of this report is not to focus on the disparities between the North and the South in terms of using ICTs, but rather, the goal is to provide government leaders and policy makers with strategies on how to assist governments in developing countries to be successful in using ICTs to do the business of government in ways that genuinely support the human development needs of each and every person. Paradoxically, the likelihood that developing countries may be successful at delivering e-Government services goes far beyond just making more investments into ICTs. More computing power integrated with the same routines for serving the public yields solutions to do the same thing faster and cheaper than before. As one observer noted, organizations remain stuck in their ways and use ICTs to “pave over the same dirt path”. Rather successful e-Government depends on two factors – the willingness of citizens to adopt and use the online service and the ability of the government to implement e-Government (Prattipati 2003). More computer power does not automatically generate better government and better lives for its citizens. Smart use of ICTs will make a difference. Making better choices to align ICTs with a well developed strategy will leverage this critical resource to give each government the capability to provide e-Government services that will help each person to get information and services about educational opportunities, healthcare, commodities, food supplies, housing, land records, and so on in a way that meets his or her needs.

In many ways, e-Government is not easy. Build a web site and expect users will use it is an approach that has failed many early government efforts into e-Government. Government organizations face great levels of uncertainty in developing and providing e-Government services

because of the complexity of the technology, deeply entrenched organizational routines, and great diversity in the acceptance of ICTs by individuals. Computer systems are like clay that is molded to shape in reflection of the values and vision of the artist. Similarly, e-Government systems reflect the values of the stakeholders involved with designing the system. An unfortunate by product of early e-Government initiatives in developing countries is that the design of some online services were inadvertently biased towards the values of the government, its contractors, funding organizations and donors, and not necessarily centrally designed based on the values, desires, and abilities of the different segments of the public served by the government. As governments develop greater skills and capabilities to build and manage e-Government applications, the greater the likelihood that the e-Government system will deliver satisfactory services to citizens. But, this will only happen when the design of the system indisputably incorporates the values of the citizen and considers the willingness and ability for citizens to use the system.

The second goal of this report, therefore, is to examine the challenges of building organizational capabilities to deliver e-Government services in developing countries. e-Government requires much more than technical wizardry for developing and operating successful online services. Significant knowledge barriers arise because the technological and managerial knowledge required to successfully deploy these complex technologies goes far beyond the simple awareness of a need for innovation (Fichman and Kemerer 1999). e-Government services are typically constrained by a combination of political, legal, public policy, organizational, technological, and human capital factors. As public organizations face great levels of uncertainty in developing and providing e-Government services, they also must be equipped with the knowledge and subsequent capabilities to respond to ongoing variations in their environment.

The third goal of this report is to examine how various factors shape the likelihood that individuals will use e-Government services. Not everyone will go online to use government services. Understanding this issue is complex. Conditions are very different among developing countries and each country has its own set of cultural, social, political, economic, and technological factors that influence whether or not its citizens will go online to use government services. If the design of e-Government systems and the access to ICTs fails to incorporate the values of the end user, the citizen, then the e-Government service is designed to do something very different from what individuals would like to do. The design and functionality of the e-Government services would essentially alienate segments of the public from useful online services and limit the ability for individuals to realize their full human development potential. This breakdown leaves high concentrations of the poor and disadvantaged with inadequate online services.

This report uses theories from research about the diffusion of ICT-related innovations and user acceptance to organize how these factors influence the degree to which the public will use e-Government services. What are the typical behaviors of citizens online? Who is likely to go online to use government services? What types of barriers and obstacles turn people away from going online to use government services? What factors encourage users to feel comfortable with e-Government services? Once a person makes a visit online, will they return? Will they encourage other people to use the site or not? The report examines what brings users to the site and makes them want to use the e-Government services. This information will help decision-makers develop strategies to increase the use of an e-Government service by considering ways to make the site easier to use, incorporating more content to meet the needs of the public, marketing and supporting user communities, and addressing issues about ICT access, security, literacy, and training.

The report develops recommendations to these issues and illustrates ways that developing countries can overcome the barriers to operate successful e-Government services through in-

depth case studies. The case studies include illustrations of the use of geographic information systems for e-Government, the role of public private partnerships as a collaborative approach to implement e-Government services, and the development of organizational capabilities to support e-Government in Gangnam-gu, a local government district in Seoul, Republic of Korea. From these case studies and interviews and workshops with government managers and policy makers from developing countries, this report makes recommendations to help developing countries move forward with offering e-Government services. The recommendations include:

- Develop a strategic plan to guide e-Government services;
- Understand the needs of all segments of public to make sure the e-Government system genuinely assists each citizen to fulfill his or her human development needs; and, enable citizens to participate in the design of e-Government services;
- Use well established system development practices to carry out the day-to-day activities of developing, implementing and maintaining e-Government services;
- Create a learning organization where employees are encouraged to participate in developing and managing e-Government services;
- Develop effective ICT governance mechanisms to assign roles and responsibilities for managing and making decisions about e-Government services;
- Develop ICT capabilities focusing on building a suitable ICT infrastructure to sustain long-term investments in e-Government, nurturing the development of human capital within the government to use ICTs for e-Government, and facilitating the skills of employees to develop and manage partnerships with private sector firms and other possible partners;
- Provide a secure experience for web visitors by developing an e-Government security and disaster recovery plan.

2. INTRODUCTION

A great challenge for the global society is to figure out how to harness the power of computer-based information and communication technologies (ICT) to raise the ability for governments in developing countries to govern, serve its citizenry and, ultimately, improve the human development conditions for its people. The World Summit on the Information Society (WSIS) declares:

“Our challenge is to harness the potential of information and communication technology to promote the development goals of the Millennium Declaration, namely the eradication of extreme poverty and hunger; achievement of universal primary education; promotion of gender equality and empowerment of women; reduction of child mortality; improvement of maternal health; to combat HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and development of global partnerships for development for the attainment of a more peaceful, just and prosperous world” (WSIS 2005).

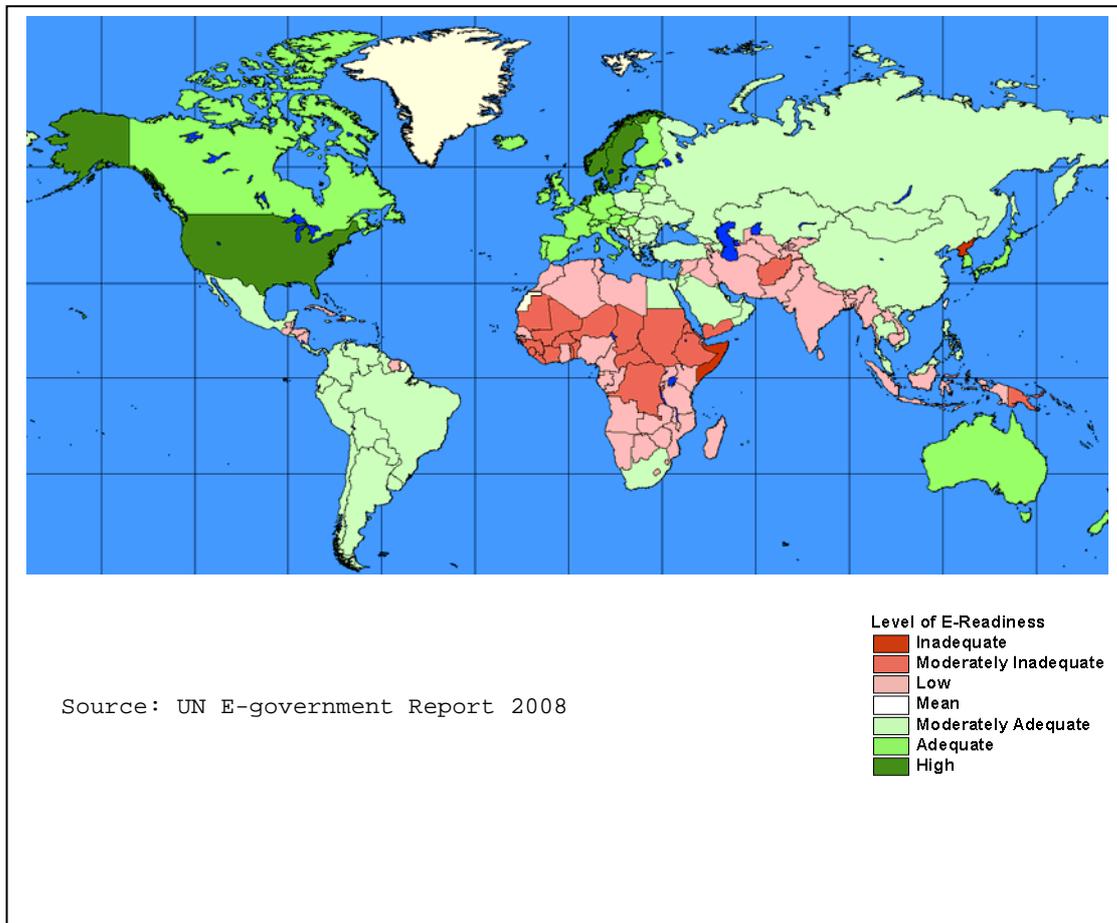
Under the right conditions, ICTs offer governments in developing countries an effective resource to serve citizens and other stakeholders through electronic-government (“e-Government”) strategies in very exciting ways. Governments worldwide are integrating computer-based technologies into the centerfold of public administrative reforms to digitize the delivery of services and the process of governing. e-Government relies on ICTs to automate the processes to serve citizens, businesses, governments, and other constituents particularly through the Internet and the World Wide Web. The World Summit on the Information Society declared in the Geneva 2003 Plan of Action that all countries should aim “to connect all local and central government departments and establish websites and email addresses” (WSIS 2005). e-Government is more than just putting in new computer systems. Rather, e-Government also involves complimentary changes to administrative practices and business processes (National Research Council 2002).

The terms digital government, electronic government (e-Government) and electronic governance (e-Governance) are used widely to represent the use of information and communication technologies in public sector organizations. The terms are very closely related, which causes confusion. Governments serve multiple roles – they provide services; they govern (e.g. set, monitor, and enforce standards within systems); and, they serve the public by governing. Because of this, the terms are often used interchangeably. For this report, the three terms are distinguished in the following way:

- *Digital government* refers to the “umbrella term that comprises all uses of information and telecommunication technologies in the public sector” (Garson 2006 18).
- *e-Government* is one aspect of digital government. e-Government refers to the provision of governmental services by ICTs, particularly over the Internet.
- *e-Governance* refers to the use of ICTs for organization of political activity within and beyond nation states. E-governance “is one of a wide range of competing terms pertaining to use of new communications technologies, such as the Internet and mobile telephony, for political and governmental purposes. Other widely used terms that have overlapping meaning include: electronic democracy (e-democracy), online democracy, cyber-democracy, virtual democracy, online governance, teledemocracy, e-participation and e-deliberation” (Chen 2008).

Various examples show the great potential of e-Government in developing countries to help people develop their full potential and lead productive and creative lives in accord with their needs and interests. e-Government is being used to make it easier for people to lead healthy lives, experience life-long learning, and access resources to sustain a reasonable standard of living. e-Government also facilitates the ability for individuals to participate in the life of their society, government and community. For example, rural farmers in India can get fair prices for their crops with instant access to prices through kiosks, school age children in Kazakhstan expand learning options by connecting to instructors in the urban centers through distance learning, and rural villagers in Rwanda can access government services through the eRwanda initiative.

Map 1 - E-Government Readiness by Country in 2007



2.1. Constraints to Building e-Government

However, using ICTs effectively to serve citizens online is a struggle for many governments, particularly developing countries. Government organizations face great levels of uncertainty in developing and providing e-Government services because of the complexity of the technology, deeply entrenched organizational routines, and great diversity in the acceptance of technology by individuals. e-Government requires much more than technical wizardry for developing and operating successful online services. This includes developing strategic approaches for organizing and assembling tangible resources such as computers and networks and intangible resources such as employee skill and knowledge and organizational processes. Consequently, government organizations need to address two factors in order to achieve success. This includes: having a significant population of citizens willing and able to adopt and use online services; and, developing the managerial and technical capability to implement e-Government applications to meet the needs of citizens (Prattipati 2003). These two factors are measured as e-Government readiness. Map 1 reports the level of e-Government readiness by country. Clearly some organizations are better at building e-Government systems than others to meet these requirements. Most of the developing countries have lower levels of readiness to provide e-Government services relative to developed countries. Governments of developing countries face similar constraints in building e-Government. These constraints acutely shape the disparity of the adoption levels and usage of e-Government in developed economies.

First, the digital divide is a barrier. As Pippa Norris describes, “[t]he OECD warns that affluent states at the cutting edge of technological change have reinforced their lead in the new knowledge economy but so far the benefits of the Internet have not yet trickled down far to South, Central, and Eastern Europe, let alone to the poorest areas in Sub-Saharan Africa, Latin America, and Southeast Asia” (Norris 2001 5). In fact, while studies show that 173 of 190 countries have developed e-Government sites to begin to use ICT more broadly to provide government services, there is great disparity and a persistent digital divide (West 2007).

Second, governments often view technology in a deterministic fashion. In other words, many adopters of new technologies expect that the technology can solve the problems of the organization. In the case of e-Government, during the “gold-rush” of the Internet boom, many governments thought that citizens would flock to the web. A team of e-Government researchers observed that governments “are often triggered by technology-driven visions of ‘good e-Government’, where organizational concerns and the usefulness of their results are less important than the deployment of ‘advanced’ technology. International or European benchmarks seem to corroborate a state of affairs where e-Government is not harnessed to goals of administrative modernization” (Dovifat, Brueggemeier et al. 2007 127).

Third, at the same time that developing countries aspire to provide e-Government services, many countries lack sufficient levels of critical resources. When making decisions about supporting e-Government services, many government leaders are concerned about trading off using scarce resources to feed, house, nurse, employ, educate and protect its citizens with making investments to develop Internet access, purchase computer equipment and software applications and train and develop human capital for using ICTs. Some government constituents are skeptical that investing in ICT-related improvements to government services will actually make citizens lives better. There are many obstacles that diminish the impact of e-Government. Each government struggles with making investments into ICTs, especially when the expected benefits may only have an indirect effect on the performance of government services. Seminal research describes this as the “productivity paradox” and observes that computerization does not automatically increase productivity. Rather, the expected benefits of ICTs may not be realized directly with increasing levels of investment ICTs alone, but it is an essential component of a broader system of organizational changes which does improve productivity (Brynjolfsson and Hitt 1998). With this context, the benefits of ICTs and e-Government are nearly invisible to policy makers and government leaders unless there are complimentary transformations of public administration practices.

Fourth, governments face developing resources and capabilities to build up the technological and managerial knowledge needed to successfully deploy e-Government services. This includes the development of skills and know-how to successfully perform the following activities:

- Digitizing information;
- Performing transactions;
- Streamlining processes;
- Enhancing employee productivity;
- Providing access to public information;
- Fostering citizen participation.

The technologies and approaches for building and operating e-Government services are obtained through technology transfer initiatives between developed countries and developing countries. This creates a great problem for developing countries because knowledge and resources are needed to modify software and hardware solutions to fit the local conditions. These modifications may drive up the cost and time to implement e-Government solutions. For example, teams of programmers are needed to write new software code to customize an application. However, as the number of software features that need to be customized grow, there is an exponential increase in the number of lines of code that need to be written, tested, documented, implemented and maintained. It has been noted that a

25% increase in the number of tasks to be modified increases the complexity of the software solution by 100% (Rettig 2007). The scope and complexity of building e-Government services is illustrated in many additional examples throughout the report.

Fifth, managers of e-Government services have to understand the technology and the citizen while navigating through the external environment. ICTs do not exist in social or technological isolation. Instead, ICTs are embedded in a organizational, cultural, and institutional context that influences the ways in which they are developed, the kinds of workable configurations that are proposed, how they are implemented and used, and the range of consequences that occur for organizations and other social groupings (Kling 2000). The following contexts, among many others, may shape the likelihood that individuals will use the e-Government services including:

- *Cultural context*: While some countries experience very high literacy rates and high levels of Internet and computer accessibility, many countries have very strong cultural norms where people prefer to socialize or conduct important business in-person instead of using the Internet;
- *Legal context*: The country's legal framework will provide protection of the rights and activities of online users through such mandates digital signature, uniform computer information transaction, online infringement liability (Nair, Kuppusamy, Davison 2005, p. 315);
- *Political context*: In many of the developing countries, the governments are very fragile from civil unrest, military coups, or making transition from one form of government to another. These factors create instability in plans to develop the resources needed to support e-Government.

2.2. Outline of Report

To deepen our understanding of these issues, this report profiles various e-Government initiatives in developing countries and analyzes how various factors are enabling and constraining e-Government to be successful in developing countries. This report looks at e-Government through a strategic management and planning of information systems framework. The strategic management framework assumes that after countries adopt e-Government services, the challenge for government leaders is to figure out how to build its resources and capabilities to assimilate or fully implement ICT, as well as corresponding administrative reforms and process reengineering.

The data gathered for this report is based on the following sources. First, I conducted a literature review of the body of academic and practitioner-oriented research on e-Government. A limited number of articles and reports have been published. To expand the research investigation, I also included research from very closely related subject areas as: ICT in developing countries; ICT for development; the adoption and diffusion of ICT; and, the social impact of ICT. Second, my research team comprised of 63 students from the University of Illinois researched in detail the e-Government strategy and status for 169 countries including all of the lesser developed, developing countries and countries with economies in transition. This activity produced detailed e-Government country briefs that serve as a database of qualitative information describing the extent of the e-Government services, components of the country's ICT or e-Government policy, history of key e-Government development events, and social-political-cultural context of ICT and e-Government. Third, I conducted workshops on e-Government in developing countries with government managers, leaders from civil society, and private-sector managers from 24 developing countries through executive education training seminars. I also incorporated insight and lessons-learned from in-depth field research studies on e-Government and ICT policy in Republic of Korea, Jamaica and Haiti.

Through this data, especially the interviews of government ministers, managers and other leaders, it is clear that e-Government presents many challenges that span both the technology and the organization. The scope of the complexity building e-Government services is illustrated in many additional examples throughout the report. Because of the uncertainty related to e-Government development, organizations face developing resources and capabilities to build up the technological and managerial knowledge needed to successfully deploy ICTs. The report has two objectives: 1) The report

summarizes the major challenges to design, build, implement, operate and maintain e-Government services; and, 2) the report outlines what governments can do to overcome the challenges from using ICTS, navigating through organizational and institutional barriers, and assuring acceptance by individuals.

In addition to the illustrations from developing countries used in the report, the report also includes in-depth case studies that provide deeper understanding for the reader. The cases include forming public-private partnerships to build advanced e-Government services more quickly and effectively, incorporating citizen input in building geographic information systems, and overcoming technical and organizational barriers to building transaction based systems for e-Government services. The report makes recommendations to help government leaders move forward to achieve higher levels of success with e-Government.

DRAFT

3. BUILDING E-GOVERNMENT SERVICES

3.1. What is e-Government?

As governments in developing countries make choices to pursue public administration reforms, many are using ICTs to offer e-Government services. E-Government is the centerpiece of information systems-supported reforms to digitize the delivery of services and the process of governance occurring across all levels of government. E-Government utilizes the Internet and the World Wide Web for both service delivery and information dissemination.

For this report, e-Government is defined as: the use of information and communication technologies in government to provide public services to improve managerial effectiveness and to promote democratic values and mechanisms; as well as a regulatory framework that facilitates information intensive initiatives and fosters the knowledge society (Gil-Garcia and Luna-Reyes 2003). e-Government is broadly defined because governments themselves serve multiple roles. By using ICTs in this way, governments expect to improve the quality of services and reduce the costs of delivering services. Other e-Government goals are to improve the utilization of scarce resources, enhance accountability and transparency, expand the role of markets, and restore citizen trust and faith in government.

3.2. Rationale for e-Government

The flow of information is essential for effective governance and managing the day-to-day business of government services. Government work is very information intensive. The production of most government services consists of creating and communicating information. Every aspect of a person's public life generates information. Each tax payment, license renewal, birth, death, marriage, land purchase, and so on generates data that is collected, processed, stored, communicated, and analyzed by most governments. All of this information is the basic ingredient for governments to govern, manage its resources, provide services, and account for its performance (Heeks 1999). Information "is a valuable national resource. It provides the public with knowledge of the government, society, and economy – past, present, and future. It is a means to ensure the accountability of government, to manage the government's operations, to maintain the healthy performance of the economy... The free flow of information between the government and the public is essential to a democratic society" (OMB 2000).

Because of this, many such administrative reforms as transparency, accountability, and openness focus on improving information management practices. Government activities require information to support internal management, public administration and regulation, and public services, as well as to make information publicly available (Heeks 1999). Citizens mandate that governments govern using quality information. Information quality means putting management systems and controls in place to ensure that information is accurate, relevant, complete, economical, verifiable, accessible, simple, and secure. To comply, governments seek to minimize the cost of managing information and maximize the usefulness of government information (OMB 2000). ICTs are the most cost effective means for capturing data from the internal operation of government organizations and for serving citizens. As part of the e-Government approach, ICTs create opportunities to reduce the costs of providing information and services to the public.

3.3. Goals of e-Government

The goals of e-Government vary considerably among governments worldwide. Rightfully, the goals of e-Government are determined locally based on the political leadership of each government. However, key institutional stakeholders influence these goals among many countries. The World Summit for the Information Society Plan of Action recommends for governments to "[d]evelop national e-Government initiatives and services, at all levels, adapted to the needs of citizens and business, to achieve a more efficient allocation of resources and public goods" (WSIS 2005). Furthermore,



governments should “support international cooperation initiatives in the field of e-Government, in order to enhance transparency, accountability and efficiency at all levels of government” (WSIS 2005). As such, these approaches reorient governments to treat citizens as customers of government services and improve the day-to-day management of financial and budgetary systems. Governments are embracing other such various forms of e-Government that: add channels of interaction among governments, businesses and citizens; improve the ability for government institutions to communicate, collaborate and otherwise work more efficiently and effectively with each other; streamline acquisition and procurement processes; reduce opportunities for corruption; and, increase the ability to capture revenue. Many of these e-Government programs are structural elements of economic

development and public sector reforms to address human development issues in developing countries (Schware and Deane 2003).

It is now growing more common for governments to use websites to enable visitors to go online to get government information, file and pay taxes, register automobiles, access vital records, communicate with government officials, and participate in decision-making. Through e-Government, governments are expected to improve performance and outcomes. Governments expect to achieve such gains as (OECD 2003):

- Online data collection to reduce data entry costs and automate error checking;
- Reduce the communication costs with citizens;
- Greater sharing of data within government and between governments and other such stakeholders as NGO’s, international agencies, and private sector firms;
- Greater re-use of data;
- Reduce government publication and distribution costs through online publication.



3.4. Types of e-Government

There are different types of e-Government based on using ICT to facilitate relationships between government and other key stakeholders. The types of relationships are with citizens (G2C – Government-to-Citizen), business (G2B – Government-to-Business), other governments (G2G – Government-to-Government), and employees (G2E – Government-to-Employees). Other studies refine these categories into smaller sub-categories. This report will use these four categories to describe the different types of e-Government services.

Government-to-Citizen e-Government Approach

Government-to-Citizen e-Government focuses on making information accessible to citizens online. This is referred to as a citizen-centric e-Government when governments take further steps to provide online services organized around citizen needs. Many early designs of e-Government web sites organized the content, particularly the hyperlinks to government services, around the pre-existing structure of the ministry and its bureaucratic procedures. This proved to confuse citizens. Citizens would spend time searching to find information through a labyrinth of web pages that mirrored the organization and structure of the ministry. Since most citizens do not understand how the internal operations of a government ministry functions, the bureau-centric organization of a government web

site caused greater levels of dissatisfaction with early e-Government sites. Web visitors would use trial and error methods to navigate from page to page on the web site and not know for certain if the next click would lead them to the information they needed or to a dead end. Learning lessons from e-commerce sites, developers of e-Government services adopted customer-centric approaches to help citizens become more satisfied with their online experience at government web sites. Typical practices of citizen-centric approach to e-Government include: organizing content around citizen needs; aligning the structure of the pages in the web site to reduce the number of clicks it takes to find information, access a service, or to complete a transaction; improving the affective qualities of the site; adding functions to facilitate the communication between citizens and the government; and, enabling the user to customize the site contents. A related Government-to-Citizen relationship is when the citizen is also interacting with government as a political actor and participant in democratic processes. E-voting and E-democracy systems support this type of relationship.

E-Government Spotlight
E-Procurement in the Peoples Republic of China

The Central People's Government of the People's Republic of China is moving forward to launch e-procurement services as part of its e-government strategy. Over the past 20 years, the government of China has developed and evolved a government procurement system that has grown dramatically (Chuanjiao 2007). From 1998 to 2004, the value of all procurements has increased from \$3.1 billion to \$213.6 billion.

China initiated a formal procurement system in 1996. The early human and paper-intensive system relied on ICTs in very limited ways primarily to process transactions and to store and track data about vendors. Under pressure to provide better services to support this growth, the Ministry of Finance created a new organization known as the Procurement Center for the Central People's Government of the People's Republic of China (PCCG) in 2003 (United Nations 2003). The PCCG's mission is to centralize procurement and to oversee the implementation of the Chinese government web portal (<http://www.zycg.gov.cn>). The portal is the centerpiece of China's e-procurement strategy. The purpose of the web portal is to facilitate the purchase of goods and services through the purchase catalogue and to promote transparency for various Central State ministries and commissions. The site receives 20,000 visits per day (Chuanjiao 2007). The portal provides instruction for making purchases and tutorials to train business personnel on procurement procedures (PCCG 2008). The portal also simplifies the process to download documents required for making bids, retrieve information about tendering and related policies, and review detailed records of all transactions, including information on buyers, suppliers, contract checking and acceptance. Future plans include building a web-based online bidding system.

Government-to-Business e-Government Approach

Government-to-Business e-Government focuses on strategies using ICTs to facilitate government interactions with the private sector to procure goods and services and to coordinate transactions from private companies. One approach is known as electronic procurement (e-procurement). Because of the large number of purchases that governments make from the private sector, there is a need to develop faster and more cost-effective routines to handle the typical procedures for procurement. The typical tasks include: material planning, sourcing, purchasing and contract management (UNESCAP 2006). E-procurement systems streamline the process of purchasing goods and services from the private sector through ICTs. E-procurement systems provide electronic catalogs or marketplaces to streamline online ordering and payment, announce calls for tender through electronic tendering solutions, and support online bidding (Moon 2002). Governments put e-procurement systems in place to improve document management, reduce costs, reduce processing times, improve access to markets for goods and services, and increase transparency of public decision-making.

Government-to-Employee and Government-to-Government e-Government Approaches

Government-to-Employee e-Government focuses on relationships within government among employees to coordinate internal operations and improve the internal efficiency of business processes. Very closely related, Government-to-Government e-Government focuses on providing services to governments through intergovernmental relations. This includes activities to coordinate stakeholders from the national, state/provincial, and local government as in the case of humanitarian or crisis response.

E-Government Spotlight

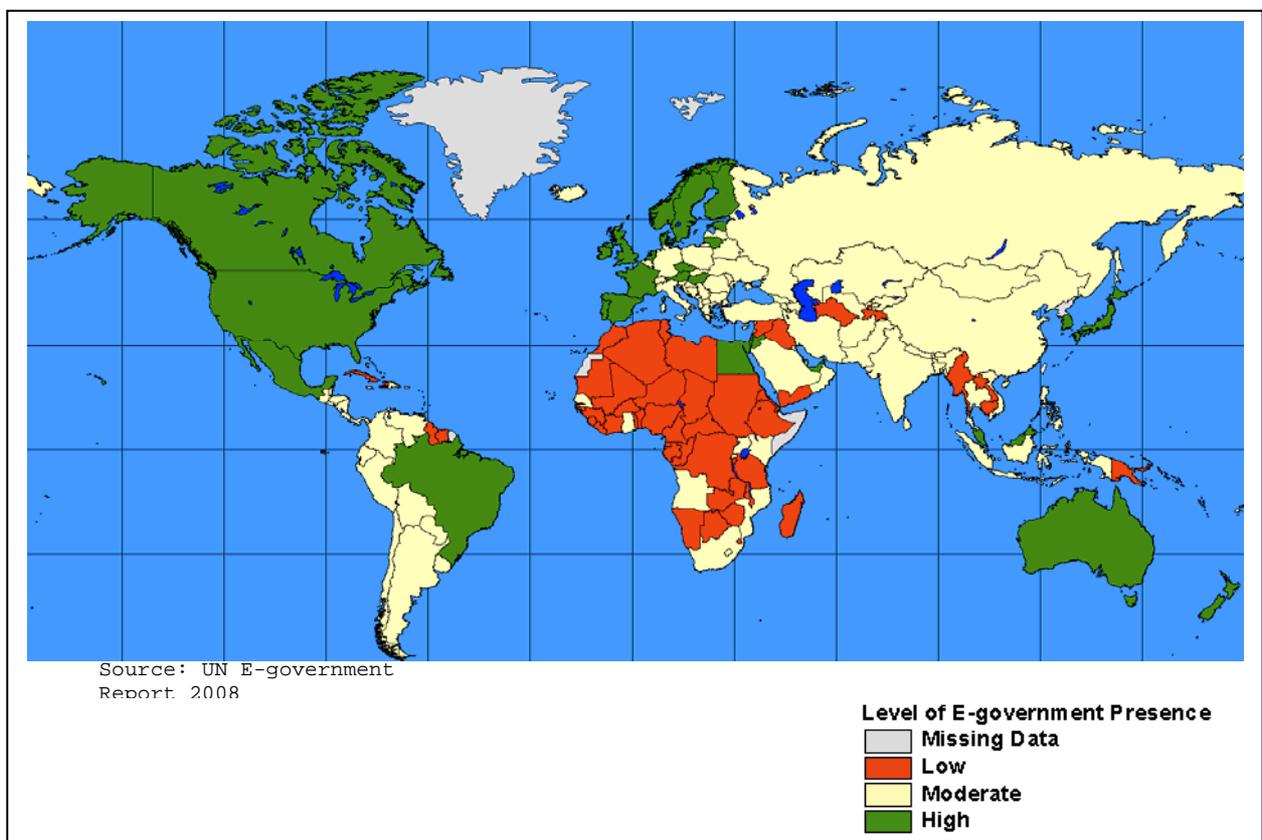
Government-to-Employee: Improving Human Resource Systems in Kazakhstan

The government of Kazakhstan is developing government to employee e-government services to improve the efficiency of managing the human resource information for the Ministry of Finance. The human resource department has recently implemented an intranet to interconnect all of the employees to newly implemented enterprise wide system for tracking critical data about employees. This intranet is a major step forward because it also is designed to eliminate the longstanding paper pushing processes. The system's database also integrates multiple databases into one system. This creates the architecture for a transformational type of e-Government service, which is most complex to build and support. The development strategy focused on using this system as a learning opportunity for the government's other agencies. Senior members of the management team are learning how to restructure workflows and redesign job functions. The managers are also learning about strategies for implementation. Currently, the department is operating the old paper-based process at the same time as operating the new e-government system. One of the challenges is to determine the best approach to archive the paper records and to develop ways to help the employees in the department to trust the new system. As the department figures out solutions to this, there will be plans to determine lessons for other e-government implementations in other ministries (Gant 2007).

4. ADOPTION PHASES OF E-GOVERNMENT

Examining the e-Government development process in greater detail reveals that there are five levels of functionality across the various forms of e-Government services. Numerous studies and reports classify e-Government services based on the level of technological development of the website and its functions. There is clear consensus that the goals, resources and capabilities of governments vary considerably. Consequently there are many different types of e-Government services available among developing countries that are evolving, in general, across increasingly more sophisticated levels of technological maturity and development (Layne and Lee 2001). E-Government services range from building sites that post important information such as agency mission, addresses, and basic documents to building sites that seamlessly tie together entire ministries.

Map 2 - E-Government Presence by Country



In this report, the level of e-Government development is classified along five levels are *Emerging, Enhanced, Interactive, Transactional, and Connected* (United Nations 2008). Map 2 shows the level of e-Government presence for each country. At the most basic level, *Emerging and Enhanced*, e-Government activities focus on publishing basic information on the web. At intermediate levels, *Interactive and Transactional*, governments use websites to support two-way communication, process transactions online, and aggregate content and services through portals. At advanced levels, *Connected*, governments use the web to integrate services across ministries, provide tools for public feedback and deliberation and customize the web visit for each user through personalization technologies and push technologies.

The first level is the Emerging Stage. In this phase, governments develop web sites to post information about different government agencies. Visitors to the web site can access information, official documents, download forms, and contact government officials through e-mail. The content is static and allows the government to have a place on the web. The site provides such basic information about the agency as the type of services provided, hours of operation, contact information, location of offices, and links to policies and procedures.

Figure 1 - Characteristics of the Emerging Stage of e-Government

Stage 1 - Emerging

- E-government presence primarily comprised of a basic web page
- Government agencies publish information on the web
- Links to other web pages containing static content
- Little interaction with web visitor



Sources: OECD (2003, p. 74-75); UN (2008); Gartner Group (2000); Layne and Lee (2001)

The second level is the Enhanced Stage. During this phase the e-Government strategy focuses on implementing channels for individuals to communicate with government officials, search for information and services. There is typically a full landscape of sites for each public organization. The user can access web features that provide greater interaction between citizens and different government agencies. As described further in this report, most developing countries fall in the first and second stages.

Figure 2 - Characteristics of the Enhancing Stage of e-Government

Stage II - Enhanced

- Web site provides more information on public policy and governance
- Clearly usable links to:
 - Other branches of government
 - Archived information such as forms, reports etc.
- Greater investment in designing site to make user experience for citizen better
 - Easier to find information
 - Better web site navigation
 - Improved content organization



Sources: OECD (2003, p. 74-75); UN (2008); Gartner Group (2000); Layne and Lee (2001)

The third level is the Interactive Stage. Governments begin to use a web portal to deliver a wide variety of services and content. Typically, a web portal serves as the gateway to the e-Government services and contains links to the different branches of government. The web visitor is able to access important information and offer features to download forms and retrieve data from agency databases that once required in-person visits to government offices.

Figure 3 - Characteristics of the Interactive Stage of e-Government

Stage III - Interactive

- Deliver wide range of online services including downloadable forms
- Initiate a web portal for the convenience of citizens, business, and others
- User can access agency databases

Sources: OECD (2003, p. 74-75); UN (2008); Gartner Group (2000); Layne and Lee (2001)

The fourth level is the Transactional Stage where e-Government strategies focus on features that allow individuals to perform such transactions electronically as making payments, filling out and submitting applications, or renewing licenses. Many of the developing countries have initiated national e-Government strategies to add more self-service applications online. For example, in such countries as Pakistan and India users can go online to pay utility bills, file and pay taxes (e.g. federal excise tax, income tax, sales tax). The applications connect the user directly to backend transaction processing systems. The online services provide access 24 hours a day, 7 days a week. ICT infrastructure developments in this phase enable government agencies to begin to implement cross-agency and shared services provided there are governance and management mechanisms in place to coordinate this type of effort.

Figure 4 - Characteristics of the Transactional Stage of e-Government

Stage IV - Transactional

- Users can enter data securely to make electronic payments or apply for ID cards, birth certificates, license renewals
- Two-way interactions between users and government
- Requires real-time responsiveness of government
- Greater focus on
 - Service quality
 - Security
 - Integration of transaction processing systems
 - Internal coordination of departments



Sources: OECD (2003, p. 74-75); UN (2008); Gartner Group (2000); Layne and Lee (2001)

The fifth level is the Connected Stage. This level features a government with ministries operating using a fully integrated ICT infrastructure to make-up an enterprise architecture. With this infrastructure, government processes are seamless. Data can be shared horizontally with other ministries or vertically between different levels of government or between external constituents. This phase includes integration across government agencies, between central and regional and local governments, and across sectors. Citizens have access to all levels of government in a transparent fashion. Governments measure the performance and quality of service and evaluate how well its ministries are doing to provide e-Government services. Tools such as customer relationship management software are used to enhance the user experience for citizens. Very recently, governments have made efforts to diversify access points by creating mobile phone applications and services. Governments are integrating Web 2.0 features such as blogs, wikis, and RSS feeds in this stage to enhance information sharing and collaboration as a way to support greater citizen participation in government decisions.

Figure 5 - Characteristics of the Connected Stage of e-Government

Stage V - Connected

- Relies on a seamless integrated ICT infrastructure
 - Implement data sharing approaches
 - Develop enterprise architecture
- Create
 - Intranets to support employees
 - Extranets to support relationships between different levels of governments
- Implement customer relationship management tools
- Permit citizen engagement and participation in decision-making processes
- Enable ubiquitous computing - access services through mobile and wireless ICTs

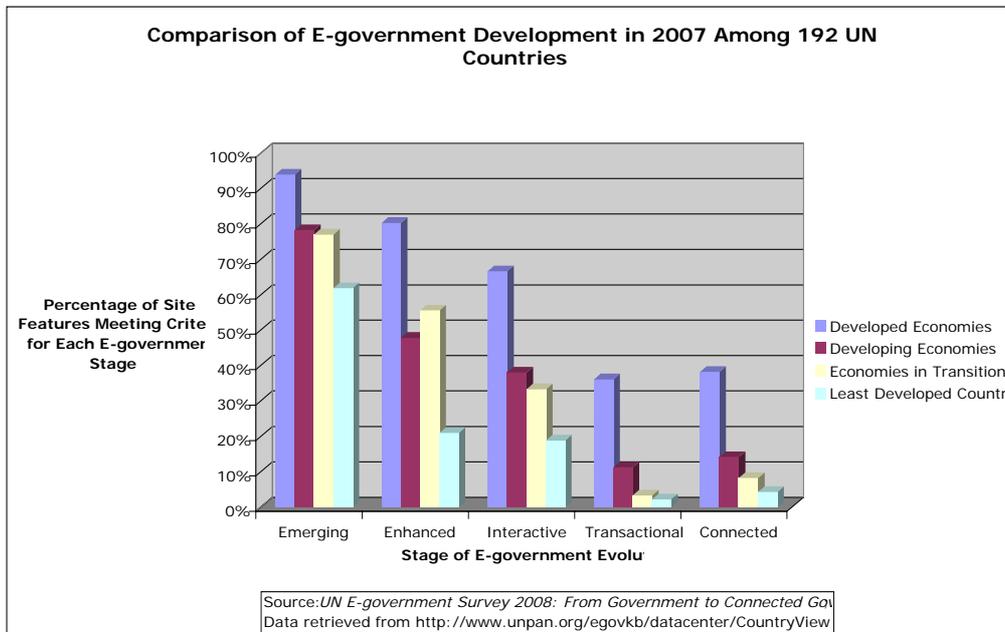
Sources: OECD (2003, p. 74-75); UN (2008); Gartner Group (2000); Layne and Lee (2001)

4.1. Descriptive Analysis of e-Government by Country

There are numerous studies that show where governments fall in terms of the level of e-Government. Evaluations of the adoption of e-Government across these five phases indicate that most countries fall in the interaction or transaction phase. Singapore is developing e-Government services that fall in the integrated phase. The Brown University Global e-Government Survey, 2007 measures significant differences between developed countries and developing countries in terms of the quality of e-Government services (West 2007). Professor West observes, “Most governments around the world have gone no further than the billboard or partial service-delivery states of e-Government. They have made little progress at portal development, placing services online, or incorporating interactive

features onto their websites. Not only are they failing to use technology to transform the public sector, their efforts mostly consist of no meaningful change or small steps forward” (West 2005 161-162). Developing countries certainly face many hurdles to advance their e-Government services.

Figure 6 - Stages of e-Government by Country



Using data from the United Nations e-Government Survey of 2008, it is clear that there is a consistent gap across each level of e-Government functionality between developed countries and developing countries (United Nations 2008). The data in Figure 6 shows that most governments worldwide have websites that meet functions at the Emerging Level and the least prevalent level are websites with functions at the Connected Level. 94% of developed countries websites are at the Emerging Level as compared to 72% for developing countries (including economies of transition countries and least developed countries). For countries with developing economies and economies in transition, the levels of e-Government functions are very similar across the Emerging, Enhanced and Interactive stages. The levels of e-Government functions among the least developed countries are significantly less prevalent than the other countries in these three stages. Countries with developing economies have e-Government sites with more Transactional and Connected features than countries with economies in transition and least developed countries. 11% of websites in developing countries have transactional e-Government features and 14% with connected e-Government features. This is significantly less than developed countries where slightly more than 36% of the same website features, Only 3% of economies in transition countries and 2% of least developed countries have transactional e-Government features. Similarly, 8% of economies in transition and 4% of least developed countries have connected e-Government features.

4.2. The Complexity of e-Government in Detail

As governments aspire to go from offering very basic services online such as hosting a static web page with government information to offering online transactions, for example, the technical and organizational issues grows in complexity. Solutions often require architects of e-Government services to use ICTs as a critical resource to transform the organization. The scope of possible organizational changes is broad as e-Government applications blossom from simple web pages to online transaction services and integrated service delivery systems. These changes in services online include low-risk and low-payoff efforts to automate and rationalize routine tasks and much more complex efforts to

reengineer business processes. Cutting edge transformations include radical reconceptualization of the organization. Consequently, system analysts, programmers, network engineers, and database administrators face inventing customized technology-based solutions. Members of the development team rely on each other to share knowledge needed to solve various problems. They also need domain-specific knowledge to design e-Government systems to fit the particular structure, work methods and requirements of the service organization deploying the application. The following chapter looks closely at each one of these three issues in detail.

DRAFT

5. CHALLENGES OF E-GOVERNMENT IMPLEMENTING E-GOVERNMENT – TECHNOLOGICAL ISSUES

In this section, the technological issues related to building e-Government services are examined in greater detail to illustrate why government organizations struggle with building e-Government services and to identify the types of skills and capabilities needed. Although many governments from developing countries are enthusiastic about e-Government and offer some level of online service, why does it remain challenging to implement e-Government services? The simple reason is that e-Government is not easy.

Firstly, e-Government involves taking computer-based technologies and combining them with human-based administrative processes to create new ways of serving citizens. Organizations have to adapt ICTs to business processes. Similarly, business processes have to adapt to ICTs. ICTs provide new functions to do things that were not possible.

Secondly, ICTs exist in a broader context. It is not only challenging for organizations to understand computer systems, it is also challenging to understand the business, legislative and political processes that makeup the day-to-day operations of all types of government institutions. Many of the processes involve numerous steps and procedures that have evolved idiosyncratically to conform to legislation, mandates, and norms based on the formal bureaucratic structure and informal employee practices of each ministry.

Thirdly, governments must understand the local context and local practices in which ICTs will be used to provide e-Government services (Walsham, Robey et al. 2007). Generally, developing countries often adopt ICTs and software that are designed in the developed world and introduced to them through technology transfer programs. Concluding from a study of the adoption of ICTs by the Mozambique Electricity Company, Esselina Macome notes, “[I]n the implementation of a new ICT-related initiative the social context, and the history and tradition of doing things within the local organizational context must be taken into consideration. Consequently this implies that the organizations need to have skilled human resources with the ability to creatively adapt new

technologies and global practices to the local context and also manage the whole process of implementation” (Macome 2003 181).

Therefore, leaders of e-Government projects need to wear two hats at once – a technology hat and a process-engineering hat. These managers, typically, must understand how to customize applications that tie-together complex computer-based technologies in concert with revamping underlying business processes and organizational structures. If worrying about marrying technology with the organization is not enough, the government is typically constrained by a combination of political, legal, public policy, organizational, technological, and human capital factors. Add to this, citizens, the end users, are very diverse in their ability to understand government services and their desire and ability to use self-service computer systems. Governments must be equipped with the knowledge and subsequent capabilities to respond to these challenges and, at the same time, deal with ongoing issues in the political, economic, and

Figure 7 - E-Government Risks



Adapted from Kendall and Kendall (2008)

social environment. System developers must adapt standard off-the-shelf solutions or build applications from scratch to develop more complex ICT solutions. These factors generate risks, as described in Figure 7, which may limit the likelihood that governments can expect to be successful in adopting e-Government.

Consequently, e-Government requires the government leaders and managers to address three issues:

- First, how do you take the technologies of the Internet and integrate them with existing information systems and existing organizational and institutional processes?
- Second, how do you build e-Government applications to meet the needs, capabilities and values of the end user?
- Third, how do you overcome the reality of the organizational, economic, political, technological, legal, and local environment that through complex factors influence and define the context of the e-Government service?

5.1. Description of Technologies to Build e-Government

The technology environment has changed dramatically since the introduction of computers in government organizations. Today, we are witnessing the convergence of personal computers and communication networks. The e-Government technology infrastructure relies on the Internet to provide communication links between the network of computer servers that provide software and hardware services to personal computers and other clients. Figure 8 summarizes the features of ICTs that provide the infrastructure to support e-Government.

Figure 8 - Features of Information and Communication Technologies that Enable e-Government Services

<i>Distributed-processing technologies</i>	Allow ICT infrastructure to scale up to support very large number of users
<i>Approaches to facilitating data interchange</i>	Development of hardware and software techniques to integrate legacy systems into newer systems
<i>Capabilities for remote service invocation across the network</i>	
<i>Database/transaction capabilities</i>	Development of secure and reliable large-scale relational databases; Enhanced data assurance with greater capabilities to ensure database integrity; Emergence of standard language for database queries using SQL, Structured Query Language
<i>Multimedia technologies</i>	Techniques to support video and audio streaming, content downloading, and real-time interaction
<i>Graphical Web browsers</i>	Applications make Internet services accessible to general users across a wide range of computing platforms
<i>Search engines</i>	Applications using indexes of Web content to help general users find relevant content
<i>Data mining</i>	Identify patterns from very large datasets
<i>Improved understanding of human-computer interface issues</i>	Approaches to better match the design, organization and layout of pages, navigation systems, content
<i>Security capabilities including public-key and other cryptographic security capabilities</i>	Methods to authenticate users, perform network monitoring, detect intrusions, protect in-transit and stored data

Source: (National Research Council 2002 39)

As the technology infrastructure evolves, many government leaders believe that e-Government systems will take the technologies in Figure 8 and build systems that will coordinate systems to process services, transactions, customer service, and all other government operations. However, the reality is very different. As Retting illustrates, "...the way most large organizations actually process information belies that glorious vision and reveals a looking-glass world, where everything is in fact

the opposite of what one might expect. Back-office systems – including both software applications and the data they process – are a variegated patchwork of systems, containing 50 or more databases and hundreds of separate software programs installed over decades and interconnected by idiosyncratic, Byzantine and poorly documented customized process” (Rettig 2007 21).

E-government Spotlight

Ghana – An Inside Look at Technological Challenges of e-Government

In the late 1990's, the government of Ghana experienced problems with the modernization of its human resource management system when it made efforts to automate the processing, storage and retrieval of personnel records of its civil service employees (Cain 1999). Ghana faced great difficulty to make decisions about how to restructure the civil service workforce across various government departments in order to carryout critical administrative reforms. At that time, many of the structural adjustment programs included goals for governments to improve efficiency and reduce labor costs by requiring reductions in the number of government employees in the public-sector workforce as a condition for loans from such international institutions as the World Bank and the International Monetary Fund.

However, the Ghana registry system failed to maintain reliable data recording the number of employees working in the public service. The available data contained numerous deficiencies including records for employees whom did not exist (e.g. ghost workers); and, inaccurate data on each employee's rank, position and tenure, and pay rate. The paper-based system for tracking employees contained many errors.

Because of these problems, Ghana was unable initially to make the workforce reductions. With growing pressure to implement these administrative reforms to comply with loan disbursements, Ghana developed human resource (HR) information systems. Ghana's efforts to build its HR system took nearly four years longer than expected to implement. Once the system went live, the data inaccuracies in the paper records caused major problems. Most employees failed to receive their paychecks for months. This created the burden to do more software programming. The data inaccuracies embedded in the electronic records continued to hamper the ability to make effective workforce reductions. Even with these challenges, however, Ghana implemented back-office database systems that provided greater data accuracy and accountability. Government leaders were able to make informed decisions and policies about personnel adjustments.

Although this experience for Ghana was difficult, the work to modernize the HR system provided a technological infrastructure to build e-Government services. After the elections in 2000, the Ministry of Communications and Technology was formed to lead Ghana in developing its telecommunication infrastructure and provision of e-Government services. The ministry's earlier initiatives centered on refining its existing administrative systems to serve as the databases for a national clearinghouse of information with the involvement of the following government institutions: Ministry of Finance, Ministry of Foreign Affairs, Ministry of Health, Ministry of Trade and Industry, Ministry of Food and Agriculture, The Office of the President, Parliament and Ten Regional Coordinating Councils (Clarke 2001).

In 2006, Ghana made another significant step ahead in its e-Government strategy by launching eGhana. The goal of the eGhana project is to enhance the growth of the ICT sector, support local ICT businesses and IT Enabled Services, and promote the development of e-Government applications and government communications. Among the many objectives, the particular focus of the e-Government strategy is to set up a high-speed government network for sharing data, implement a web portal, improve the security of government databases, improve the training of government ICT-related employees, and establish standards to support the interoperability of its computer systems(World Bank 2007).

As Ghana moves forward, its leaders are wrestling with emerging issues to further grow the use of e-Government services. The use of mobile phones has exploded, especially to use mobile communications to access a growing collection of audiovisual content. However, a policy-maker observed that most of this content involves pornography, sports, and entertainment and would rather see more content to addressing more pressing needs of education, employment and empowerment (Orhin 2007). Ghana's leaders are also growing concerned that it must create an Internet culture within the country where more people feel comfortable about using government services online. To meet this objective, the Parliament is considering legislative initiatives to prosecute Internet fraud and the Ghana Information Communication Directorate is improving system assurance with strategies to link together administrative systems and raising the operating performance (e.g. minimizing the down time of computer servers and equipment) of these systems (Orhin 2007). This will build trust in the e-Government services as the systems become more reliable.

5.2. Closer Look at e-Government Failure

Clearly with the pressures of using technologies and issues of managing ICT-enabled services, government leaders fear taking on e-Government projects that may fail. While estimates vary, approximately 60% of e-Government projects fail. There are no official statistics on the failure rate of e-Government projects in developing countries. The UN Report, *e-Government at the Crossroads*, concludes that despite the very limited data on e-Government failures, the number of projects that fail is high (United Nations 2003). “Some analysts estimate the rate of failure of e-Government projects in countries with developing economies to be very high, at around 60-80% (with the higher rate of failure characteristic of Africa). This can look like a staggering figure - until one reviews data concerning the industrialized countries. Gartner Research puts the rate of failure of e-Government projects at about 60%. The Standish Group estimates that only 28% of all ICT projects in 2000 in the U.S., in both government and industry, were successful with regard to budget, functionality and timeliness. 23 % were cancelled and the remainder succeeded only partially, failing on at least one of the three counts” (United Nations 2003 60-61).

Researchers have identified numerous reasons for these failures including (Kreps and Richardson 2007):

- Drivers of ICT Project Failures;
- Systems delivered late;
- Creeping scope;
- Software not reliable and robust;
- Software not delivering the promised functionality;
- Lack of integration and effective interface with legacy systems;
- Escalating costs;
- Lack of consultation with users or stakeholders;
- Data integrity and confidentiality issues;
- Poor knowledge of the system and lack of suitable training.

5.3. Overcoming Failure Through Systems Development Approaches

A contributing factor to these failures is that government institutions may not use system development practices effectively to implement its e-Government systems. System development methods use a structured approach to analyze, design and implement information systems to support users and the business functions of an organization. Systems analysis involves working with the users of the system to identify their needs and incorporate steps to build the system within the constraints of the organization to meet those needs. Implementing a system without proper planning may yield an e-Government service, for example, that is dissatisfactory to the user and cause the system to fail ultimately (Kendall and Kendall 2008).

This may occur for several reasons. First, practices for developing e-Government systems may only minimally incorporate the realities of local conditions. The methodologies for developing information systems, generally, are taught mostly in academic and professional institutions in developed countries and focus on organizations with relatively abundant resources and other favorable conditions. For example, a group of researchers note that information system development practices need modification to work in local African conditions. “The information system development practices and methodologies being taught and used in industrialized countries have been designed with a much more affluent and less constrained setting in mind than which African ICT actors find themselves in.

Information system development practices are not universal as such, but need to be adjusted to any given socioeconomic, cultural and organizational setting” (Korpela, Soriyan et al. 2000 134-135).

Second, standard system development approaches use a highly structured approach to determine the system requirements and to build and implement the system. The benefits of this approach is that the development carefully gathers and analyzes detailed information about how the government service functions, how data flows throughout the system, how humans interact with the business processes and data, what works and what does not, and what the users wish would happen. The downfall of this approach is that it is time-consuming and costly. The development activities tend to focus on attempting to define all of the specifications of a system before it is launched. Additionally it is difficult for people in organizations to know what they want before the system is built (Upton and Staats 2008).

As such, government organizations implementing large-scale e-Government projects, particularly ones that involve developing enterprise systems, fall in the trap similar to private sector companies. “[ICT] projects are costly, take a great deal of time, and deliver value only when the project is completed. In the end, they yield systems that are inflexible and cement companies into functioning the way their businesses worked several years ago, when the project started... Companies often find it exorbitantly expensive and difficult to modify their enterprise systems in order to exploit new business opportunities” (Upton and Staats 2008 118). “In the light of these results, a socio-technical approach towards information systems development is recommended. Concepts like “incremental decision-making” or “improvisational change management” are suggested to match with the results of each stage reached during the respective project. Hence unplanned change is not considered as disruptions, which have to be avoided, but as opportunities to improve the project results” (Dovifat, Brueggemeier et al. 2007 127). This approach assumes that it will be difficult to identify all of the system requirements and there will be other unforeseen circumstances. Researchers Upton and Staats (2008) refer to this as the “path-based method.” Organizations are finding success in developing large-scale systems when the development team is able to build the system over time through a process where system requirements are defined and refined to meet changing needs and new opportunities. Details on the types of capabilities and resources to do this are explained further in this report and illustrated in the following case studies.

6. CHALLENGES OF E-GOVERNMENT – UNDERSTANDING THE CITIZEN

In addition to understanding how best to integrate various technologies to supply e-Government services, government leaders also face a second challenge of meeting the demand for e-Government services. What are the typical behaviors of citizens online? Who is likely to go online to use government services? What types of barriers and obstacles turn people away from going online to use government services? What factors encourage users to feel comfortable with e-Government services? Once a person makes a visit online, will they return? Will they encourage other people to use the site or not? Government leaders can only expect to realize the benefits from cost-savings or better service quality if the user population grows. In this chapter, the report examines what brings users to the site and makes them want to use the e-Government services.

The emerging trend in e-Government is to design services to focus squarely on the needs of citizens. One of the goals of e-Government in many countries is to consider the web visitor as a “customer.” By in large, the predominant visitor is the citizen. He or she also may be other government employees, private businesses, civil society organizations, non-governmental organizations, media organizations, the international donor community and many additional sub-groups. It is difficult to understand the needs of the citizen as a “customer.” Additionally governments are different from commercial organizations and must provide services to all of its customers instead of to certain market segments. Government organizations are entrusted with responsibilities to be good stewards of information and develop cost effective means to capture, store, process, and communicate information for everyone equally. And these customers have no choice about which government to deal with. So, e-Government services must cover the breadth and diversity of individuals who may have a wide range of skills, language abilities, education levels, income and beliefs.

Ongoing research considers how various factors influence whether or not an individual citizen will use an e-Government system. Successful e-Government depends on two factors – the willingness of citizens to adopt and use the online service and the ability of the government to implement e-Government to match the needs of the citizen and web visitor (Prattipati 2003). The research examining the adoption and use of e-Government applies theories based on the Diffusion of Innovations and technology acceptance. This report adapts a widely used research framework based on these theories to describe the acceptance and use of ICTs by individuals to the case of e-Government in developing countries. This framework is formerly known as the Unified Theory of the Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris et al. 2003).

The Diffusion of Innovations model examines how the use of an innovation such as the Internet to access government services, spreads among a population of users over time. Typically this model distinguishes the general population based on whether an individual decides to use e-Government when a service is first introduced or after it has become very popular. Early adopters tend to be risk takers and also have the means to be one of the first to use an e-Government service. Late adopters tend to be very risk averse and may also lack the means to use an e-Government service. This model is effective to understand how fast different segments of the population are choosing to use an innovation.

In many instances, policy makers would like to understand why are different segments of the population using an e-Government innovation. To help policy makers and government leaders understand more about its citizens, the Unified Theory of the Acceptance and Use of Technology (UTAUT) reveals how certain individual level factors influence whether or not a citizen will use an e-Government site. These theories suggest that among many factors such characteristics as age, gender, income and education play a role in explaining whether web visitor will use an e-Government service depending on the extent to which he or she feels comfortable based on:

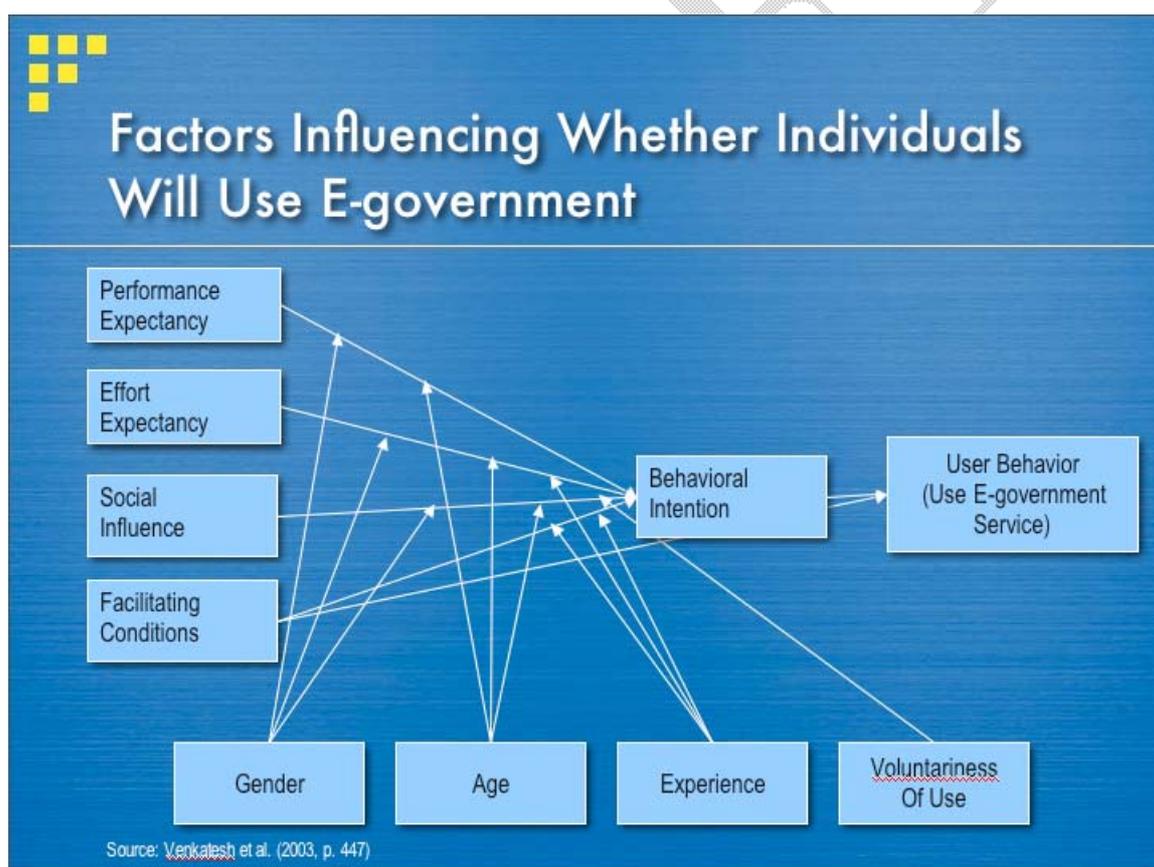
- How likely that using the e-Government service will help an individual to meet their needs (Performance Expectancy);

- How easy the site is to use, how motivated they are to use the site versus using other means such as accessing a service in-person (Effort Expectancy);
- How much family, friends, and others influence his or desire to use e-Government (Social Influence);
- How accessible ICTs and Internet access is to each person for using the online service (Facilitating Conditions).

These factors are more formerly conceptualized as Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. The model is described in Figure 9.

Although much of the earlier research focuses on e-Government in developed countries (e.g. (Carter and Belanger 2005)), researchers report in a review of the scientific literature that similar studies of the acceptance and use of e-Government are emerging based on developing countries (AlAwadhi and Morris 2008). This includes a study of the adoption of e-Government services in Kuwait (Gupta, Dasgupta et al. 2008), online and tax paying e-Government system in Taiwan, the adoption of e-Government by senior citizens in China, the impact of gender and education in the use of e-Government in Turkey, the attitude of students about e-Government in Lebanon, and the adoption of e-Government in Oman.

Figure 9 - E-Government Model of User Behavior



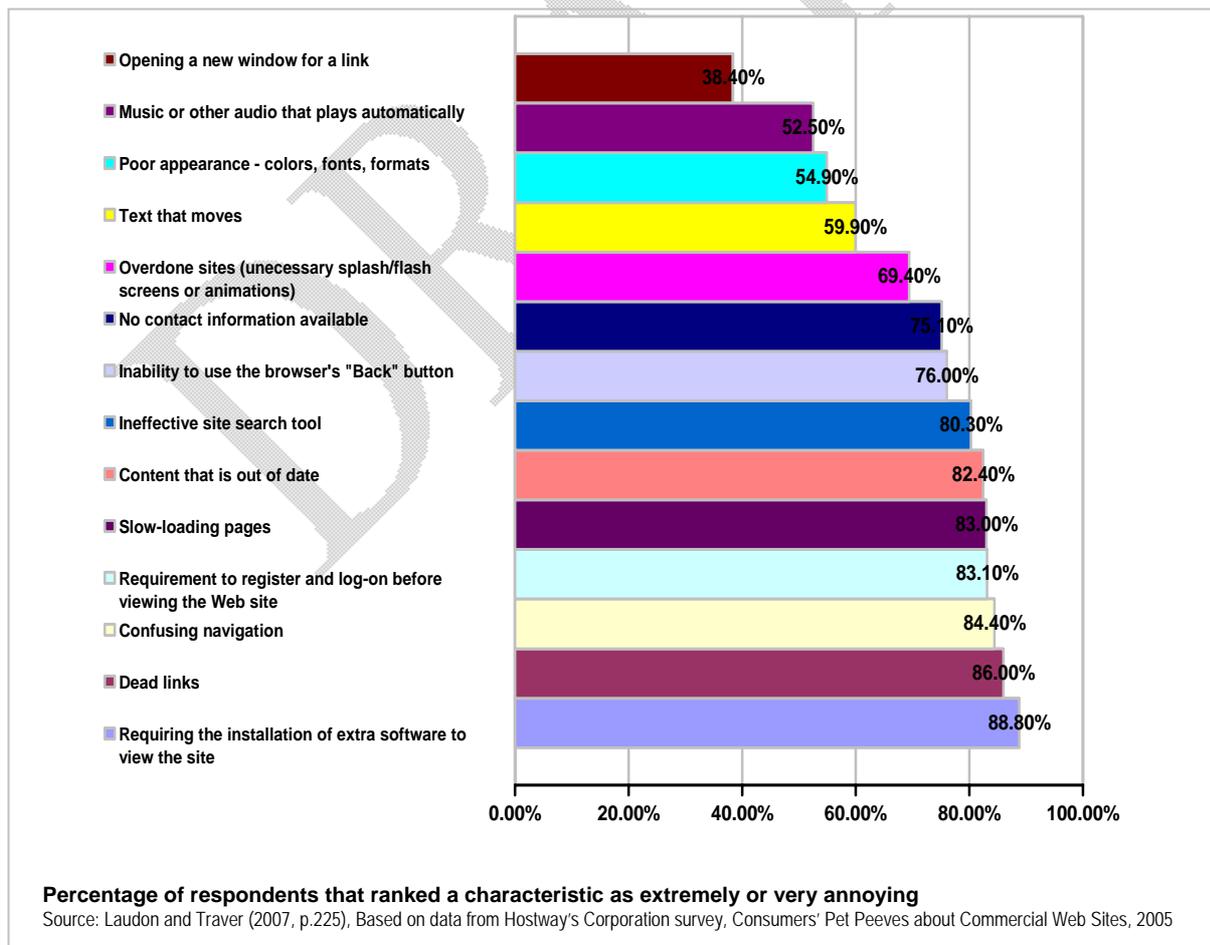
6.1. Performance Expectancy

Performance expectancy describes the extent to which an individual believes that using a system will help him or her attain gains in his or hers human development. Does using the system improve opportunities to obtain a job or perform well in his or her job, find and participate in educational activities, and otherwise increase the freedom of users to participate in processes that deeply affect their lives (Walsham 2007)?

6.2. Effort Expectancy

Effort expectancy is defined as the degree of ease of using the system. This is based on whether the individual user feels as if a great deal of learning is necessary for using the system, how complex the system functions are, and other issues related to literacy and the use of ICTs. In a review of e-Government sites of developing countries, this report determined that many of the sites fall short in making it easy for web visitors to use the online government services. Additionally, many of these factors are determined as features that may annoy web visitors. Although, there is no published data on the experience of e-Government visitors, there are lessons from e-commerce that are insightful about which deficiency matters most to web visitors. The data in Figure 10 ranks the most annoying factors (Laudon and Traver 2007 225).

Figure 10 - Lessons from e-Commerce: Annoying Features on Websites



The research team evaluated the e-Government site of each developing country and determined that the five most prevalent problems are the following:

**Figure 11 - Results from Website Evaluations:
5 Most Common Problems with Developing Country e-Government Sites**

<i>Problems with e-Government Sites</i>
<i>Site contains broken hyperlinks</i>
<i>Site fails to have a logical navigation structure</i>
<i>Slow loading of pages</i>
<i>Hard to find service or information</i>
<i>Misleading description of services</i>
<i>Language barrier</i>

6.3. Social Influence

Social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system.

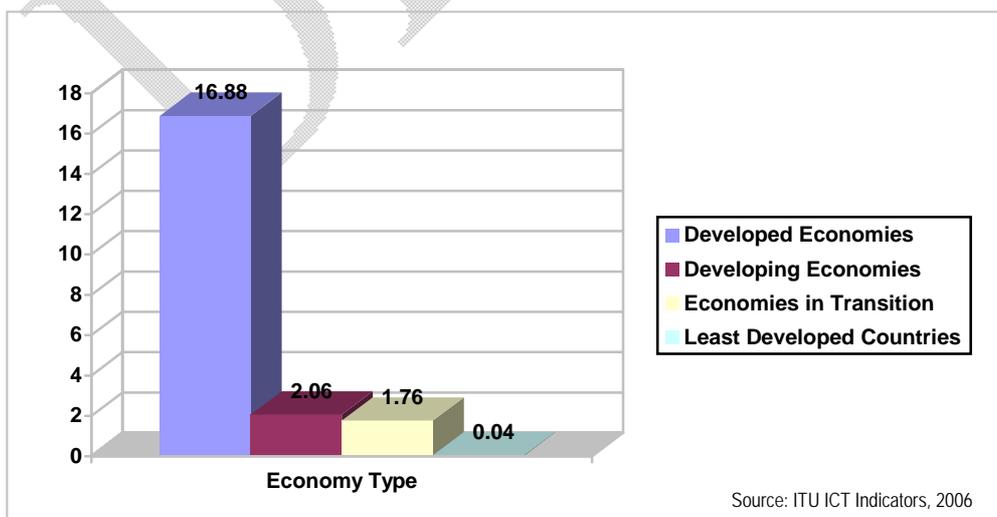
6.4. Facilitating Conditions

Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. More detail on improving Internet access and the influence of political unrest is described further.

Enhancing Access to ICTs and the Internet

Benchmark measures indicate that although there remain persistent disparities between world regions in the use of ICT and Internet access, there is significant improvement in the number of Internet users. Measures from the United Nations Millennium development goals show that Internet use is growing, even though overall use remains low in developing countries (United Nations 2007). The number of Internet users in developing countries lags far behind the number of users in developed countries as seen in Figure 12.

Figure 12 – Number of Users with Broadband Access per 100 Inhabitants



In developing regions of the world, for example, in just three years from 2002 to 2005, the number of Internet users grew from 4 users per 100 people in the general population to 9 users per 100 people.

Sub-Saharan Africa, for example in just three years from 2002 to 2005, the number of Internet users per 100 grew from 1 user per 100 to 3 users per 100 people in the general population. The greatest growth in Internet use is among the Commonwealth of Independent States region where the number of users has increased three-fold, followed by countries of South-eastern Europe and Northern Africa. This growth in the use of the Internet expands the opportunity to reach more citizens online that may use more online government services potentially.

Governments in developing countries are taking various approaches to expand the level of Internet access. E-Government shifts the focus away from automating processes to using such new digital tools and resources as personal computers, kiosks, telephones, and personal digital assistants to make government more accessible to its citizenry. In the early days, citizens access e-Government services through personal computers from their home, office or school, telecenters or libraries. Today access points are expanding so that citizens can access e-Government services through mobile technologies.

Governments can expect e-Government to payoff in achieving these outcomes as the number of citizens using the Internet for services and commerce grow. E-Government relies on a growing number of citizens turning to the Internet to conduct parts of their lives through computers and other emerging technologies. As the numbers of Internet users within a country grow, government can expect the average cost per online transaction to fall if they also begin to grow comfortable accessing government services online. Also as the number of users grow, it is likely that new users will be attracted to the e-Government services.

Impact of Political and Social Unrest on Individuals

For example, while some countries experience very high literacy rates and high levels of Internet and computer accessibility, such as Samoa, the culture is such that people prefer to socialize or conduct important business in-person instead of using the Internet. This also includes: “communication infrastructures, income, education level and demographic profiles, limited accessibility to ICT infrastructure and services, lack of competition in the ICT sector, low ICT awareness and literacy, lack of killer content, weak electronic business environment, legal framework (e.g. digital signature, uniform computer information transaction, online infringement liability)” (Nair, Kuppusamy et al. 2005 315).

In many of the developing countries, the governments are very fragile from civil unrest, military coups, or making transition from one form of government to another. These factors create instability in plans to develop the resources needed to support e-Government. Difficulties also emerge as government transition to democracy. In addition to these problems, the threat of drought and disease is pervasive. Programs may win over the desire to make investments to provide Internet access. Other environmental factors are that many developing countries must comply with the conditions of donor programs and loans.

6.5. Gender and e-Government

A factor that requires further study is the role that gender plays in shaping the patterns of e-Government adoption and use in developing countries. There are numerous studies of ICT use by gender that can provide insight into this issue. It is clear from various studies of ICT use that there are significant differences in the patterns of using ICTs along gender lines, particularly in developing countries. A growing concern is that while e-Government initiatives promise to improve the delivery of government services, efforts to empower women through ICTs are emerging slowly as a core value of e-Government strategies in developing countries causing many women to fall behind in gaining the benefits of e-Government in comparison to men. In this section, the important issue of how gender plays a critical role in shaping the use and adoption of e-Government services is examined.

In efforts to build e-Government services in developing countries, governments face challenges to overcome disparities in how men and women use and have access to ICTs. The divide is further distinguished in developing countries. “Most women within developing countries are in the deepest

part of the divide further removed from the information age than the men whose poverty they share. If access to and use of these technologies is directly linked to social and economic development, then it is imperative to ensure that women in developing countries understand the significance of these technologies and use them” (Hafkin and Taggart 2001, p. 1).

The empowerment of women focuses on using ICTs to achieve the following goals (Huyer and Hafkin 2006):

- Support women’s ability to make decision and affect events and circumstances around them;
- Benefit from resources and opportunities;
- Exercise control over their own life, body and resources;
- Have a say in public life and decision-making.

Because of this divide, the impact of ICTs to empower women has had limited effect in developing countries.

Understanding this issue is very critical. The United Nations Millennium Development Goals seek to promote gender equality and empower women. This is further reinforced through the goals and actions of the World Summit on the Information Society (WSIS) in both the Geneva (2003) and Tunis (2005) rounds. The goals and actions for addressing the gender divide in ICTs include:

- To “harness the potential of information and communication technology to promote the development goals of the Millennium Declaration, namely ... the promotion of gender equality and empowerment of women” (WSIS 2003 1).
- And further states, “[w]e affirm that development of ICTs provides enormous opportunities for women, who should be an integral part of, and key actors, in the Information Society. We are committed to ensuring that the Information Society enables women's empowerment and their full participation on the basis on equality in all spheres of society and in all decision-making processes. To this end, we should mainstream a gender equality perspective and use ICTs as a tool to that end” (WSIS 2003 2).
- “We recognize that a gender divide exists as part of the digital divide in society and we reaffirm our commitment to women’s empowerment and to a gender equality perspective, so that we can overcome this divide. We further acknowledge that the full participation of women in the Information Society is necessary to ensure the inclusiveness and respect for human rights within the Information Society. We encourage all stakeholders to support women’s participation in decision-making processes and to contribute to shaping all spheres of the Information Society at international, regional and national levels” (WSIS 2005 4).

There are numerous factors at stake to improve the opportunities for women to use ICTs and to use e-Government services. If women are limited in their access services through ICTs, they may become marginalized. “Those who are unable to look for better deals on the web, to conduct financial transactions, to access government services, to learn about health information, to seek out political information, and voice their own viewpoints may lose out in various realms of life. Not being able to use the medium may result in less effective political participation, less knowledge about government services, and less useful information seeking with respect to human-capital enhancing activities (e.g. job searches, educational opportunities, health concerns)” (Hargittai and Shafer 2006 434). Additionally, “however, with economic and academic success depending more and more on a facility with information technology, any disparity in interest or proficiency that differs systematically with gender is a problem for society” (Cooper 2006 321).

While e-Government and access to ICTs may improve the lives of women, some e-Government services may not reach women, especially those living in poor and remote rural communities. Most

women in developing countries face various challenges and barriers that may limit the opportunities to use ICTs and to realize fully the benefits of e-Government. A summary of such barriers include:

- Physical access to the Internet may impact women differently than men;
- Few women and young women participate in vocational and college/university courses in ICT-related fields;
- Many women are less likely to find significant value from ICTs because they are less acquainted with the economic, social and psychological gain.

First, gaining access to the Internet and personal computers is typically more difficult for women than men in developing countries. One of the factors that may constrain the level of access to e-Government services is the extent to which women on average in developing countries have easy access to computers connected to the Internet that is affordable. ICTs are frequently introduced in developing countries to benefit the elite communities and applications such as e-Government benefit groups that already have access to information, power, and services through their social status and networks (Nath 2006). In these cases, the lack of gender-specific services is likely to create barriers to access to ICTs and e-Government services.

This issue is carried out, for example, in efforts to open up Internet access points through telecenters, community technology centers, schools, libraries, and kiosks. However, the greatest density of Internet connections in developing countries is unevenly distributed and favor urban areas predominately. This bias creates opportunity for urban dwellers and anyone who travels frequently to urban areas. In developing countries, a significant proportion of women spend most of their lives working and living in rural areas causing them to have far less access to the Internet (Hafkin and Taggart 2001) (Hafkin and Taggart 2001). High levels of poverty further exacerbate this. In many countries of the Asia-Pacific region, women are served by ICT infrastructures that are “very poor including outdated telephone lines, over loaded networks and long installation periods, limited competition (market monopoly), higher service fees, bureaucracy and bribery in network connections (telephone)” (Wangmo, Violina et al. 2004 12). Furthermore, “the likelihood of women in rural areas or poor women in urban areas having access to new technologies is low in countries where fewer than 10 percent of the population is connected” (Hafkin and Taggart 2001 p. 13).

Even in the case where special initiatives open up connectivity to the Internet in rural areas, there are social and cultural barriers for that may be more difficult for the average woman than men. Many women may fall into gender-specific routines that occupy her day with activities that sharply reduce the time and money available to use ICTs. Women tend to have less time for leisurely web use and less able to familiarize themselves with the Internet (Cooper 2006 p. 321). As an illustration, the rural community of Bamshela in KwaZulu/Natal, South Africa was among the first villages to open a telecenter and introduce personal computers and computer networks, as well as phone services. Many women, for example, follow gender-specific roles and “spend their lives engaged in subsistence farming and perhaps some small-scale income-generating activities. They spend up to six hours each day collecting water and fuel. In many respects, their lives have not changed from those of women generations before: the closest they may ever come to a telecommunication resource is to witness the local shop owner using a telephone or cash register” (Schreiner 1999 65).

Additionally, there are differences in attitudes about ICTs by gender in developing countries. First, in many developing countries, widely held beliefs are evolving through various cultural norms that leave many women feeling that the Internet is more appropriate for men to use. “What is clear, however, is that computer anxiety has disproportionately affected females in the past, and continues to do so into the 21st century” (Cooper 2006 321). This is reinforced as many of the Internet access points are in places that are uncomfortable socially and culturally for women.

Lastly, literacy, language and vocational skills create access barriers for many women. Over two-thirds of the people who lack literacy skills are women. The educational divide that exists drives the disparity in literacy between men and women in developing countries. Most women tend to have less

access to schooling in general. Relatively few women only participate in small numbers in vocational or college/university programs in computer science, information science, or other related fields in comparison to men. Similarly, very few women participate in ICT-related vocations. In terms of the labor force, “few women are producers of information technology, whether as Internet content providers, programmers, designers, inventors, or fixers of computers. In addition, women are also conspicuously absent from decision-making structures in information technology in developing countries” (Hafkin and Taggart 2001 1). Most of content of the Internet is dominated by English, which limits the extent to which women are attracted to go online, Consequently many women in developing countries are falling behind in building specialized knowledge about ICTs.

DRAFT

7. CASE STUDY – PUBLIC-PRIVATE PARTNERSHIPS FOR E-GOVERNMENT: KEYS TO SUCCESS

Among the many challenges that governments face is whether it makes sense to build and manage e-Government services using in-house resources, outsource, or form a collaborative partnership. This decision is difficult, as government leaders have to assess the organizational and information technology capacity of the organization and whether it is cost-effective to manage the development internally with existing staff or oversee the work of outside vendors.

As part of public administration reforms, governments are increasingly turning to the private sector to partner or collaborate in building e-Government services. Efforts to enable the private sector to play active roles in government are a critical component of public administration reforms. The WSIS Plan of Action calls for governments to “formulate national strategies, which include e-Government strategies, to make public administration more transparent, efficient and democratic” (WSIS 2005). It also encourages each country “to establish at least one functioning Public/Private Partnership (PPP) or Multi-Sector Partnership (MSP), by 2005 as a showcase for future action” (WSIS 2005). Governments are actively forming partnerships with private sector companies to build and manage e-Government services. By forming collaborations through public-private partnerships, for example, governments are able to leverage the knowledge and expertise of private sector companies. This allows government organizations to build and implement e-Government solutions based on technical specifications that exceed their own knowledge and capabilities.

e-Government systems consist of complex process innovations and reengineering strategies that rely heavily on the systematic integration of old and new ICT components with critical functions of the service delivery system. Some governments may be working with limited ICT assets in place. Major e-Government initiatives involve some level of coordination and communication with almost every functional unit of the organization related to government service. For many government agencies, the pool of employees with the requisite information technology skills is small. Veteran employees have mainframe and PC-era skills and lack such internet-era skills as managing and developing client-server software-based solutions. And if the government department does have employees trained with the latest technical skills, it is difficult for governments to keep wages in pace with opportunities in the private sector. Consequently, governments are actively forming partnerships with the private sector and civil society to garner the expertise needed (Williams 2003). Through these partnerships, the partners are sharing risks and rewards, their employees are working seamlessly together, and their employees are also co-developing and exchanging ideas and knowledge and learning through joint problem-solving activities. This level of cooperation typically occurs in collaborations and is not likely to occur in a traditional contractual relationship.

Such public-private partnerships exist to aid ICT implementation initiatives in many developing countries. The government of Mozambique is partnering with Italy in a public-public partnership through the GovNet initiative. “GovNet will allow the government of Mozambique to implement new e-Government systems that improve its internal operations and better connect with its citizens. The first stage of GovNet will include a secure intranet for internal communications and a set of Web portals to improve quality and coverage of public services delivery and increase participation in government decision-making processes. The first stage will involve 21 government departments in Maputo, including some 800 workstations, new process management guidelines, training, and the identification of steps for expanding GovNet to new ministries and out to the municipalities” (Government Technology 2003).

7.1. Public-Private Partnership in Andhra Pradesh

In India, the state government of Andhra Pradesh implemented an e-procurement service in 2001 as a critical component of its e-Government portfolio of services. Andhra Pradesh is the most populated state in southern India. Government leaders of Andhra Pradesh desired to modernize the complex paper-intensive processes using ICTs. However, in the time leading up to this project, the government

of Andhra Pradesh made relatively very modest investments into its information technology infrastructure. As such, there were very few computers in use across the administrative departments and the government lacked the appropriate level of organizational and technical capabilities to design, implement, and maintain any type of web-based transaction processing system.

In spite of lacking an adequate ICT infrastructure and technical skills, the leaders of Andhra Pradesh pushed forward to fulfill its strategy by forming a public private partnership with the high tech firm, Commerce One India. Through this collaboration, Commerce One India provided much needed technical expertise in developing Internet applications and also agreed to operate the e-procurement system. In exchange for taking on these responsibilities, the government of Andhra Pradesh allowed Commerce One to earn revenues by charging users a 4% transaction fee. The development process was also carried out with a great deal of involvement of companies that supply the government of Andhra Pradesh with goods and services. Suppliers also played an important role. First, suppliers provided feedback to help the government decide on the best design of the e-procurement system during the early phases of the project. Second, suppliers participated actively in various meetings and training sessions. These factors contributed to the success of the e-procurement system. Approximately \$8 billion of transactions were processed through the e-procurement system in 2005. Among the issues that the government of Andhra Pradesh plans to resolve are developing a process to centralize supplier registrations, standardizing procurement processes across all of the government departments, and passing more legislation to support e-procurement (UNESCAP 2006).

7.2. Lessons from Study of New Models of Collaboration for e-Government

Through the study, “New Models of Collaboration” (http://www.ctg.albany.edu/publications/online/new_models/), the Center for Technology in Government studied how collaborations can foster the development of e-Government services that rely on advanced technologies and innovative solutions to complex operational processes. Collaborations from the United States, Canada, and Europe reveal that leadership, trust, risk management, and communication and coordination are all critical success factors for governments to manage the process of building and operating e-Government services with one or more partners.

One of the key lessons from this research highlights how government organizations developed communication methods to overcome the significant barriers that the technical developers (e.g. computer programmers, systems analysts, database developers, and network administrators) commonly experience when building e-Government services.

Key lessons for making such collaborations to work include the following seven management practices:

- Introduce problem-solving teams to provide employees with direct input into improving the government service;
- Rotation across jobs improves ideas for teamwork and makes use of broader worker skills;
- Information sharing is important to provide the information and motivation for greater involvement and decision making;
- Training is needed to do problem solving and to increase skills for day-to-day decision making;
- Incentive pay, in the form of some type of pay-for-performance, is introduced to offer the incentive for greater employee involvement;
- Job security provides the understanding that improving a service performance will not result in the direct loss of jobs;

Careful screening and selection of workers is required to obtain those who are more skilled in both the direct job-related (technical and analytical) skills, as well as the “team skills” to work together to solve problems and to respond to rewards on the job.

8. CASE STUDY – THE OPPORTUNITY OF GEOGRAPHIC INFORMATION SYSTEMS TO ENHANCE E-GOVERNMENT SERVICES

8.1. GIS and e-Government

Computerized mapping technologies known as geographic information systems (GIS) are giving governments new software tools to support the delivery of services to the public. GIS belongs to a family of ICTs that are specifically designed to link information to a geographic location. By using GIS, users can view information on digital maps organized by political and administrative boundaries and even by neighborhoods, cities, rural areas, regions and countries. GIS gives users powerful functions to display, query, and manipulate the data. For example, GIS is widely used to view demographic trends, income levels, voting patterns, pollution levels, traffic on highways, and crime patterns.

Governments are integrating GIS with e-Government services. Governments provide services to locations within the jurisdiction of their political and administrative boundaries. As such governments are stewards of large databases ranging from information about the demographics, characteristics and activities of its people, communities, institutions, infrastructure, natural resources, and public services. GIS makes it possible for governments to easily see data on maps. GIS gives governments the tools to integrate many layers of independently collected and managed data, such as roads, pipes, surveys, land records, and administrative boundaries (Dangermond 2002). Marrying GIS with e-Government applications empowers citizens with user-controlled maps served over the Internet while viewing a government web page using a personal computer, personal digital assistant, or mobile phone. GIS is used in a broad range of public sector applications including, for example, land use and urban growth planning, legislative districting, conservation, benchmarking human services, emergency management, environmental monitoring, humanitarian relief, natural disasters and public information services (O’Looney 2000).

The convergence of communication, database, and GIS technologies is moving GIS applications far beyond basic map-making and opening opportunities for GIS-enabled e-Government applications. GIS tools are becoming more accessible to the public and employees in all parts of a government ministry through technological advancements. GIS tools are increasingly accessible through the Internet. Web-based maps are growing in popularity through applications like Google Maps. Government organizations are integrating GIS with many other existing applications and databases. More advanced GIS applications also include such capabilities as statistical analysis, operation research modeling and automated spatial modeling, mobile computing features using real time or near real time data (e.g. global position systems data), enterprise-wide database integration, user-controlled customization of analytical and modeling tools, and deployment of expert systems and artificial intelligence agents. With this infrastructure, GIS can be used to support operation and decision-making activities across the organization (Somers 1998). Through this approach, governments use GIS to support e-Government efforts to link data in a seamless and relatively easy-to-use format. This includes using GIS to combine data from multiple sources. This enables the government organization to share both new and legacy data widely and to integrate the same data in many different applications, which greatly enhances the functionality of e-Government services.

8.2. GIS and e-Government in Developing Countries

In developing countries, GIS is being used to manage many of the complex issues affecting human development and the delivery of government services. GIS relies heavily on building the underlying base maps used to provide the location of roads and transportation infrastructure, waterways, political boundaries, and topography. Much of the GIS work in developing countries centers on building a spatial data infrastructure. In Botswana, the government has digitized all of its paper maps enabling the development of a national atlas. The Kenyan government has built a national map and database to track natural resources. UNDP has partnered with the Somalia government to develop a comprehensive GIS database of the settlements, road networks, schools, health facilities and water

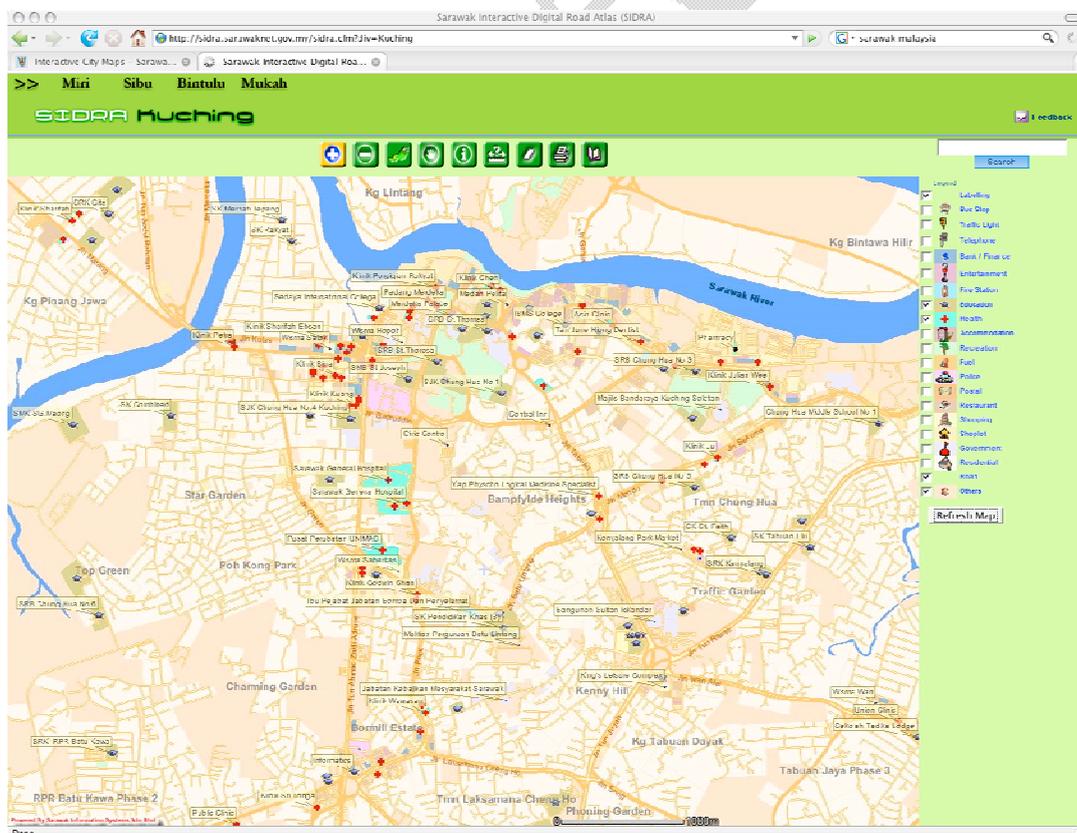
resources to assist with inoculations and to map contaminated wells (ESRI 2002). Without a well-developed set of GIS base maps, efforts to use GIS are stymied.

GIS played an important role in assisting with the relief efforts for the Indian Ocean tsunami in 2006. However, there were difficulties that limited the effectiveness of the world community to use GIS to respond to the crisis. A published report observes, “Since this disaster affected many countries and the world's economy, it can be deduced that the problems encountered were diverse. One main problem was that the technology level differed dramatically from country to country. Some countries made relatively good use of GIS, but some could not. Other problems were lack of data, data sharing, communication, and standardization. These problems also created duplication of data. Moreover, accessing data and up-to-date information was difficult and slow. Political obstacles in the government structure and lack of collaboration between agencies worsened the situation” (ESRI 2006).

8.3. GIS-enabled e-Government Service in Malaysia

The state government of Sarawak, Malaysia uses enterprise wide GIS as a central component of its e-Government strategy. Sarawak, the largest state in Malaysia has taken its enterprise data and built a GIS interface to make geospatial information and technologies available on every employee desktop. Employees access the GIS data through a one-stop web portal that serves as a geospatial data clearinghouse. State government leaders believe that this strategy improves the quality of information used to manage public services. The GIS tools are easily accessible and the tools are very user friendly and the data is well organized and documented (ESRI 2005). The government also provides map information through a GIS based tool known as Sarawak Interactive Digital Road Atlas (SIDRA). Users can view health, education, public safety, shopping and other important information overlaid on a map with the local road network (<http://www.sarawak.gov.my/content/view/19/43/>).

Figure 13 - Using GIS to Provide Information in Malaysia



8.4. Enterprise-wide GIS in the Slovak Republic

The Slovak Republic, for example, developed an enterprise-wide GIS to support e-Government services for environmental management (Tuchyna 2006). The Ministry of the Environment of the Slovak Republic spearheaded a complex initiative to streamline the process of sharing and using data from across seven different departments including, the Geological Survey, the Slovak Hydrometeorological Institute, the Slovak Water Management Enterprise, the State Nature Conservancy, the Water Research Institute and the Slovak Caves Administration, the Slovak Museum of Nature Protection. The enterprise GIS application was challenging to implement. The agencies and departments had very different ICT infrastructures. To build GIS maps to do various analyses required users to navigate mostly on an ad hoc basis through heterogeneous operating systems and backend database systems that had limited levels of interoperability. With this phase completed, users can access and publish data in a seamless and transparent fashion. No special knowledge is needed since the Ministry of the Environment implemented data standards and standard GIS tools for building its spatial data infrastructure. The Ministry of the Environment is making improvements to overcome some additional challenges that many government organizations face such as data incompatibility, low accessibility, data gaps, duplicity of collection efforts, insufficient access to metadata, varying standards and a low level of coordination (Tuchyna 2006).

8.5. GIS and e-Government in South Africa

The enterprise approach to GIS also enables governments to extend the reach of e-Government services to mobile and wireless technologies in developing countries. In South Africa, GIS and mobile and wireless technologies are used to support government efforts of building e-Government systems to manage health related issues. This includes such examples as the tracking of tuberculosis, HIV/Aids, and malaria (Tanser, LeSueur et al. 2000).

The Public Health Ministry in South Africa pilot tested using GIS and global positioning satellite (GPS) tools to track the spread of communicable diseases in rural villages. Public health workers travel to remote villages and go from house to house to check on people with illnesses. The location coordinates of the villages are marked using GPS. Also the GPS includes a data entry form where the public health workers can record data about the villager based on their visual inspection and diagnostic interviews. The information is sent via cellular technology to the central public health office. The data updates different map layers and integrated into a GIS. The public health analyst can determine trends and patterns and develop strategies for treatment. Unlike tabular reports, the maps allow for highly effective identification of diffusion patterns. The data can also be overlaid with other related data such as the location of streams, roads, etc. to study causal factors in the spread of the disease.

8.6. Participatory GIS and e-Government

In addition to enterprise-based GIS applications, a growing trend in GIS is for developing country governments to implement map applications that allow users to participate actively in local decision-making through e-Government services. WSIS endorses using ICTs to extend democracy and facilitate public participation in decision-making. “We acknowledge that multi-stakeholder participation is essential to the successful building of a people-centered, inclusive and development-oriented Information Society and that governments could play an important role in this process. We underline that the participation of all stakeholders in implementing WSIS outcomes...” (WSIS 2003). For example the Regional Workshop on Designing e-Government for the Poor encouraged policy makers and government leaders to develop approaches to enhance stakeholder participation in e-Government (Asian Development Bank Institute 2005). There is a range of citizen participation that extends from using government services to citizens being involved in the discussion and deliberation process. The OECD characterizes citizen or public involvement in government decision-making as (OECD 2001):

- Information and transaction – government informs citizens (one way process);

- Consultation – government consults with citizens (citizen’s responses generally predetermined by government via multiple-choice, closed-question options);
- Deliberative involvement – government engages citizens in consultation process (citizens encouraged to deliberate over issues before final response)
- Government-led active participation – government instigates consultation and retains decision-making powers;
- Citizen-led active participation – citizens are actively engaged in decision-making processes, alongside government; citizen decisions become binding; citizens share ownership and responsibility over outcomes (Kingston 2007).

To address these issues, organizations are working with governments and groups in developing countries to implement participatory mapping approaches for building GIS-enabled e-Government services. Participatory GIS relies on various approaches using GIS to give citizens the opportunity to become more actively engaged in their communities with the aim of improving local services and the fabric of their area (Kingston 2007). Participatory GIS “is based on using geo-spatial information management tools ranging from sketch maps, Participatory 3D Models (P3DM), aerial photographs, satellite imagery, Global Positioning Systems (GPS) and Geographic Information Systems (GIS) to compose peoples’ spatial knowledge in the forms of virtual or physical, 2 or 3 dimensional maps used as interactive vehicles for discussion, information exchange, analysis and as support in advocacy and decision making” (IAPAD 2007). Examples include watershed mapping in Ethiopia, natural resource management in Uganda and the Rufiji district of Tanzania, and forest management in Nepal.

In summary, GIS is being used increasingly to support the e-Government strategies in developing countries and is making an impact on the complex issues affecting human development in developing countries. GIS is a complex technology for governments to use. It relies heavily on computerized map data that needs to show the key features of the area within the jurisdiction of the government. Building these data sets has been the primary work of GIS initiatives in the early stages. Once the maps are available, they are a reusable resource and considered by many to be a public good. So developing countries need to establish governance of the GIS data to control accessibility, accuracy, and responsibility for updating, distribution, and data sharing.

9. CASE STUDY - ORGANIZATIONAL PERSPECTIVES OF IMPLEMENTING E-GOVERNMENT: LESSON LEARNED FROM SEOUL, REPUBLIC OF KOREA

9.1. Local Autonomy and e-Government in Seoul

The case of developing e-Government systems in a local government in Seoul, Republic of Korea, illustrates the difficulty that governments typically face when building and implementing e-Government services and how they have developed organizational capabilities to overcome these challenges. The Seoul Metropolitan Government as well as many of its local government districts, including the Gangnam district (“Gangnam-gu”), offers highly innovative e-Government services. Organizations like the local governments that make up the Seoul Metropolitan government system face high levels of uncertainty in moving services online. As described earlier in this report, assimilating the technological infrastructure is complex, organizational routines are deeply entrenched and difficult to transform, and individual citizens vary greatly in the likelihood that they will use online government services. Additionally, the local governments in the Republic of Korea are transitioning to a democratic system after a long history of central government and military rule. This means that the local governments are going through the growing pains of bringing in new democratic institutions, norms and practices that, in turn, shapes how e-Government services are crafted.

Democratic reforms through local autonomy policies in the mid-1990 gave local governments in the Republic of Korea the authority to govern and operate most civil services. In times leading up to the reforms, the central government managed national and local government affairs through a rigid bureaucratic civil service system. Through a series of incremental reforms, constitutional amendments authorized local governments to elect a mayor and council in 1995. This was the first time that the local municipal governments were held directly accountable to citizens and the locally elected officials that represent citizens. As one senior manager reflected, the focus of local government managers shifted from serving the central government to serving citizens, placing a significant responsibility on departments to be responsive to citizen needs.

9.2. The OPEN System

At the same time of the democratic reforms of the mid-1990’s, the Internet began its emergence as a new medium for governments to serve citizens. The Seoul Metropolitan government developed an e-Government service known as the OPEN System in 1999. The OPEN System is designed to provide citizens access to online civil applications. The hallmark of the OPEN System is that it fully integrates functions in the design of the website to reduce the opportunity for corruption by making all steps in the civil application evaluation and decision-making processes transparent to citizens who visit the website. The OPEN system uses ICTs to reduce the costs process decision outcomes and share this information openly with citizens. By visiting the city’s website, a citizen can fill out a permit application, submit it, and track its progress through various decision making steps. This citizen can see each phase of the administrative process and determine the length of time taken to process a permit, request for service, and other civil applications. Outcomes of the civil applications are posted to inform all citizens. Other citizens can inspect the information to check the disposition of requests and applications. If a citizen detects irregularities in the process or outcomes, he or she can file a formal complaint. Additionally, the system is used internally to evaluate the performance of employees and departments and to ensure compliance with public laws and regulations. Posting this type of information online is an easy way for citizens to hold government officials accountable and fulfills WSIS goals to improve local governance.

9.3. E-Government in Gangnam-gu

Near the same time as the Seoul Metropolitan government launched the OPEN system, Gangnam-gu led local government districts to build an e-Government service to processes transactions and accept online payments with its parking control system. Gangnam-gu is a local government district in the Republic of Korea. Gangnam-gu makes up one of the 25 local government districts of the city of Seoul. Approximately 557,000 people live in Gangnam-gu. Gangnam-gu is a relatively affluent city that is best known as the nation's financial and business center, including the greatest concentration of leading computer and software development firms in the country.

The district government of Gangnam-gu was an early adopter of the Internet as a means to provide services online. Gangnam-gu initiated its e-Government services in 1997. After achieving early successes, Gangnam-gu organized its strategy as part of its "Smart Gangnam – Cyber City Project." Through this initiative, Gangnam-gu developed the STAR system to streamline internal administrative processes and opened its online parking services to the public.

9.4. E-Government Services to Streamline Internal Efficiencies

Many e-Government services open up the opportunity for greater public scrutiny, which for many departments increases the political costs of launching a particular e-Government service. Gangnam-gu, like most local governments, experienced these concerns when it first launched the STAR system. STAR is a large-scale e-Government project that consolidates administrative functions from several departments. The STAR system uses an enterprise architecture to integrate data from various administrative processes and makes the data available for multiple functional departments. Employees at different levels and responsibilities use the data from the STAR system internally. It is also used directly by citizens and businesses.

The STAR system provides two lessons for operating e-Government services that rely on enterprise-wide data and ICT infrastructure. First, governments may experience greater levels of success when they are able to build an ICT infrastructure that can be serve as a foundation for long-term future enhancements. This enables the STAR system to support applications that integrate data from disparate data sources and to distribute the information to not only desktop machines, but also to other mobile and wireless devices such as personal digital assistants and cell phones. Gangnam-gu ICT managers note that this approach ensures that online services are in complete synchronization with data from transactions of citizens who visit the service delivery center in-person. Consequently, the ICT managers developed customized solutions to tie together new databases with legacy databases and to integrate these databases to a web portal. All of the managers are also very concerned about addressing privacy issues and security issues.

Second, through interviews with government leaders from developing countries, managers fear that enterprise systems are met with employee resistance. In Gangnam-gu, employees were slow to support

Figure 14 - Gangnam-gu e-Government Sites



efforts to build its enterprise system initially. Many of the employees feared sharing data. The data could expose problems. To resolve this concern, the IT department developed organizational routines to carefully check the accuracy of the data before releasing it publicly. There is a data review committee that oversees the data quality assurance processes. Many other governments worldwide experience the same concerns. Gangnam-gu developed a solution that may have had significant short-term costs, but now has greatly enhanced its e-Government services for the long run.

9.5. Online Parking Services in Gangnam-gu

Under the Smart Gangnam strategy, Gangnam-gu launched an online parking service in April 2000. Gangnam-gu put its parking services on the Internet through a website that automates various routines as enforcing parking regulations, documenting infractions, issuing citations, recording infractions, collecting fines, and resolving disputes. The development team analyzed underlying business and operational processes to find ways to use information and communication technologies to make these paper and labor-intensive tasks simpler, less repetitive, and less wasteful. The current online services are provided through an ICT infrastructure comprised of a combination of interrelated databases, data communication networks, and interface components.

Gangnam-gu administrators faced many challenges in building its technology infrastructure to support its parking services. This case demonstrates many important lessons for building capabilities to implement and manage e-Government services.

10. CONCLUSIONS – STRATEGIES TO MAKE E-GOVERNMENT SUCCESSFUL IN DEVELOPING COUNTRIES

There is growing interest to determine how to assist developing countries implement e-Government services. Many developing countries have implemented ICT applications to deliver information and services to the public through the Internet. As the enthusiasm of e-Government grows, many developing countries continue to utilize more sophisticated web sites with more features to do a better job of helping citizens, businesses, other governments, and other web visitors. Government web sites are evolving from simple web pages to sites organized around a web portal comprised of search tools, links to online transactions, citizen-centric content, and two-way communication links to government officials. Much of the effort to date by developing countries to deploy e-Government services has been to build pilot projects. The next horizon is to take the lessons learned from the first-round of e-Government initiatives to build and manage applications designed for long-term sustainable service to the public and to transfer this knowledge widely among developing countries. The goal of this report is to provide government leaders and policy makers with strategies on how to assist governments in developing countries to be successful in using ICTs to provide e-Government services in ways that genuinely support the human development needs of each and every person.

There remains still a great disparity and a persistent digital divide in how well governments are able to adopt and implement e-Government services. It is well established that governments in developing countries fall behind the rest of the world with e-Government. As many developing countries improve, it will be imperative that government leaders focus on building resources and capabilities to design, implement and maintain ICTs that power e-Government services. Certainly much work is needed to help many developing countries acquire the requisite hardware, software, networks, and people. The greater challenge is to help many governments figure out how to put the pieces together in a way that provides services to meet the needs of the public. Success therefore depends on government leaders to develop strategies to address how to enhance the willingness of citizens to adopt and use government services with ICTs and how to improve the ability of each ministry to implement ICTs.

The particular challenge for governments in developing countries is to build organizational capabilities to customize e-Government applications to local conditions. “[I]n the implementation of a new ICT-related initiative the social context, and the history and tradition of doing things within the local organizational context must be taken into consideration. Consequently this implies that the organizations need to have skilled human resources with the ability to creatively adapt new technologies and global practices to the local context and also manage the whole process of implementation” (Macome 2003 181).

e-Government leaders must understand how to customize applications that tie-together complex computer-based technologies in concert with revamping underlying business processes and organizational structures. Significant knowledge barriers arise because the technological and managerial knowledge required to successfully deploy these complex technologies are particularly more demanding for many governments in developing countries. These managers are routinely constrained by a combination of political, legal, public policy, organizational, technological, and human capital factors that may be significantly different from typical experiences in developed countries.

One of the key issues for developing countries governments is how to manage the process of learning about new technologies and finding appropriate ways of implementing the technology to support its e-Government systems. Government managers in charge of building and managing e-Government systems are on the forefront of managing the process of assimilating ICTs. ICT assimilation is a series of steps through which new technologies or ICT-enabled processes are identified, assimilated and institutionalized (Applegate, McFarland et al. 1999). It is during this process that organizations take so many different approaches to identify possible system options, learn how to assemble the various ICT components with the underlying business processes, rationalize the management of the system through management controls and governance, and carryout widespread technology transfer (Applegate,

McFarland et al. 1999). This report looked more closely “inside the black box”, to clarify the issues of assimilating the e-Government services into the organization. When organizations do this process well, the system will more likely meet the needs of the public. Otherwise the system is not aligned with the public, and potentially may fail.

10.1. Key Lessons in Developing e-Government Systems

To address these issues, this report makes the following seven recommendations to assist government leaders with building the capabilities and resources to design, implement and maintain e-Government services.

- Develop a strategic plan to guide e-Government services;
- Understand the needs of all segments of public to make sure the e-Government system genuinely assists each citizen to fulfill his or her human development needs; and, enable citizens to participate in the design of e-Government services;
- Use well established system development practices to carry out the day-to-day activities of developing, implementing and maintaining e-Government services;
- Create a learning organization where employees are encouraged to participate in developing and managing e-Government services;
- Develop effective ICT governance mechanisms to assign roles and responsibilities for managing and making decisions about e-Government services;
- Develop ICT capabilities focusing on building a suitable ICT infrastructure to sustain long-term investments in e-Government, nurturing the development of human capital within the government to use ICTs for e-Government, and facilitating the skills of employees to develop and manage partnerships with private sector firms and other possible partners;
- Provide a secure experience for web visitors by developing an e-Government security and disaster recovery plan.

Lesson 1: Develop a Strategic Plan

ICTs are a strategic resource. As such governments are likely to realize greater levels of success serving the public through the Internet when they develop a strategic plan. First, developing a strategic plan for e-Government is essential for leaders to guide their ministries. Through interviews with government managers from developing countries, many managers revealed that strategic planning efforts are useful to do because they help the organization develop a vision of how to deploy e-Government services and a road map to follow to deliver the services. When asked a follow-up question to find out how many governments actually follow through and develop a strategic plan, most of the managers confirmed that their governments failed to complete the work. Managers that I interviewed from Singapore, the Hong Kong Special Administrative Region of the People’s Republic of China, Romania, Seoul Metropolitan government and some ministries in India all indicated that the strategic e-Government planning process was central guiding the direction of e-Government, but not a widespread practice within each ministry or department.

The problem, however, rests in the details of executing the activities to create an e-Government strategic plan. One the issues that managers agreed on was that there is usually confusion about identifying which employees should participate in the planning process. e-Government has been developed using both a top-down and bottom-up approach often simultaneously in many government organizations (Garson 2006). A manager commented that it was typical in his ministry for the top-level managers and directors to formulate a strategic plan. This would ensure that the political leaders would be directly involved and the plans would support the political agenda of the prime minister. However, a second manager from the same government said that e-Government ideas, solutions and

subsequent plans were actually being developed through a bottom-up approach. The ministries were given minimal direction about using the Internet. Tech savvy staff teamed up to experiment with ideas and developed small e-Government applications, which were deployed without formal approval or support from the executive levels. The manager felt that more technical employees with actual experience with Internet based technologies should be part of the strategic planning process.

Additionally, it is important to take an involvement-oriented approach to developing an e-Government strategy. Many governments structure decision-making and work tasks using a control-oriented employee hierarchy. While this creates efficiency to complete routine decisions and tasks, it encumbers the effectiveness of organizations to problem-solve, share knowledge, and otherwise be innovative. It is imperative to involve employees in all aspects of e-Government systems development. For example, frontline workers have detailed knowledge of “customers”, as they are closest point of contact with the public. Gangnam-gu asks ICT employees to get involved in initiatives to formulate the e-Government strategy of the functional departments. This has helped the department to focus on how to improve existing and new processes of the e-Government services and monitor and resolve dependencies that arise through e-Government service provision.

The goal of the ICT/e-Government strategic plan is to ensure that managers have a clear approach for managing the ICT department in spite of their limited knowledge about ICT. The plan develops an inventory of the computing needs of each department, categorizes the components of the ICT infrastructure, provides guidance on how to protect the security and emergency management of all ICT-enabled services, and creates a timetable to integrate fragmented application programs into an enterprise architecture.

Lesson 2: Understand the Needs of the Citizen

Second, when building e-Government systems, great effort is needed to understand the needs of the users and to implement applications that work within their competencies. Governments have to provide services to all citizens, which adds great complexity to the design and functionality of online computer applications. The applications need to be easy to use and anticipate the diversity of citizen’s literacy levels, computer skills, and self-service competencies. As described in the report, however, conditions are very different among developing countries and each country has its own set of cultural, social, political, economic, and technological factors that influence whether or not its citizens will go online to use government services. If the design of e-Government systems and the access to ICTs fails to incorporate the values of the end user, the citizen, then the e-Government service is designed to do something very different from what individuals would like to do. The design and functionality of the e-Government services would essentially alienate segments of the public from useful online services and limit the ability for individuals to realize their full human development potential. This breakdown may leave high concentrations of the poor and disadvantaged with inadequate online services.

In asking managers about whether or not their government used formal techniques to gather information about the user, all of the managers indicated that these techniques were not widely used. One manager commented that by the time the testing phase of the e-Government development project occurred, the delays and cost overruns put pressure on to go forward with implementation with only informal evaluations by citizens. One government that conducted user studies gained significant benefits, which greatly improved the design of its e-Government services. The development team conducted numerous user studies with local citizens to test alternative system designs. This process helped the system development teams to make careful selections based on citizen input regarding the interface features including the organization of the content, the structure of the navigation system, and even the reading level of the website material.

Lesson 3: Use Well Established System Development Practices

Third, an important goal is to improve the quality of government services. Government services tend to focus on serving the internal bureaucracy. It is natural to build computer-based systems that reinforce well-established administrative practices and routines. Organizational change is difficult.

However, e-Government practices include finding ways to modify well-entrenched procedures with changes in work practices and integration of ICTs. Government ministries can make considerable improvements to the quality of public services by taking time to document and analyze each administrative process. This information and knowledge will give managers greater confidence to make decisions on how to transform services from offline to online. The managers will have deeper understanding of the steps involved in various administrative processes. Sharing this knowledge will build a shared understanding across employees in the organization, which may build a foundation for further process innovations.

Lesson 4: Create a Learning Organization

Fourth, create a learning organization. The better that an organization is at learning, the better it will be at finding ways to resolve the uncertainties of technological and process innovations, which are the hallmark of e-Government initiatives. The strategy centers on building an organizational environment where employees actively create new knowledge derived from their experiences and share it with other employees. To be effective, government leaders should look for ways to give employees the motivation, opportunity and structure to share knowledge and build the requisite ICT capabilities. Managers should also consider developing ICT-tools to build a knowledge management system to serve as a repository to support its e-Government efforts.

In the case about in the report describing e-Government practices in Gangnam-gu, this local government achieved success in building a learning organization to support the development of its online parking services in the following ways:

- Created a culture where lessons learned from one project are shared with a new e-Government project by rotating managers through e-Government development projects, setting up cross function technical teams among the ICT department, creating joint technical/management problem-solving teams, adhering to software engineering standards for documentation, and establishing standards for the technical infrastructure;
- Developed the technical skills of the internal employees;
- Required ICT employees with technical backgrounds to have managerial knowledge so they would understand the context of the system and business process they are supporting;
- Cross-trained non-technical employees to understand e-Government with an intensive management training program for employees, including the subjects of managing organizational change, customer service practices, leadership, organizational culture, communication skills, and creating excellent workplace quality.

Lesson 5: Develop Effective ICT Governance

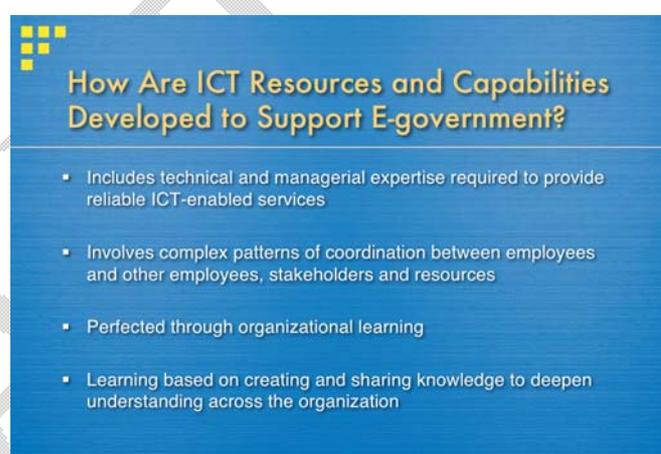
Fifth, effective e-Government requires strong ICT governance. ICT governance refers to the organizational capacity to control the formulation and implementation of ICT strategy. The goal of good ICT governance is to align ICT strategy with the organizational operations. ICT governance is implemented through the rules, policies and regulations governing ICT planning, resource allocation, system development, training and service provision. A key component of strong ICT governance is to align it with the e-Government strategy of the government. To implement an ICT governance plan, the government should develop a leadership structure, an oversight organization, and a decision-making process. A common concern is that having a low status in the ministry undermined the decision-making authority of the ICT department. The ICT department in many government ministries is considered a support function. From this perspective, the department focuses on automating administrative tasks, serving the ministry with computer support, and maintaining data resources. In this capacity, the department leaders have very little input into decisions about how ICT will be used and lack opportunity to share how ICTs can create new opportunities to support various initiatives. In seeing the strategic importance of ICTs, many governments in developed countries have elevated the

status of the ICT function so that its leaders are directly involved with executive level decisions and planning. The top leader is designated typically as the Chief Information Officer or Chief Technology Officer.

Some of the particular issues that should be resolved with an ICT/e-Government governance plan include: Will the ICT function be organized as a centralized department or will the ICT function be decentralized and rest within the authority of each ministry? Or will a federated approach that combines both centralized and decentralized authority structures be more effective? What will be the responsibilities of the ICT governance committee? How will the ministry develop routines to support learning about e-Government? Some governments have created in-house learning academies to support learning among employees and with private industry vendors. There is not a single best solution that fits all organizations. The strategy is contingent on each government. The goal, however, is to create an environment where decisions are made effectively, consistently, and authoritatively to eliminate wasting resources.

Lesson 6: Develop ICT Capabilities

ICT resources and capabilities of government organizations are increasingly becoming an integral component for transforming the delivery of services. ICT capabilities refer to the ability of an organization to leverage its assets to fulfill its information technology-related strategic objectives. ICT capabilities include both the technical and managerial expertise required to provide reliable ICT-enabled services (Broadbent and Weill, 1999). Governments must develop the ability to leverage resources and capabilities, particularly information technology capabilities, to develop and implement e-Government services that are culturally sensitive and reflect local contexts.



How Are ICT Resources and Capabilities Developed to Support E-government?

- Includes technical and managerial expertise required to provide reliable ICT-enabled services
- Involves complex patterns of coordination between employees and other employees, stakeholders and resources
- Perfected through organizational learning
- Learning based on creating and sharing knowledge to deepen understanding across the organization

There are various types of organizational and ICT capabilities that developing countries need to build. These capabilities exist through contributions of ICT-based assets and routines. ICT capabilities include both the technical and managerial expertise required to provide reliable IT-enabled services. Jeanne Ross and her colleagues note that organizations must build and leverage a strong ICT staff, a reusable technology base, and a partnership between the ICT service functions and management in order to add value to the organization through information technology (Ross, Beath et al. 1996). Expanding on this, Feeny and Willcocks (1998) describe nine IS capabilities necessary to ensure successful adoption and implementation of “high-value-added” ICT applications including: leadership; business systems thinking; relationship building; ICT architecture planning; making technology work; informed buying; contract facilitation; contract monitoring; and, vendor development.

Lesson 7: Provide a Secure Experience for Web Visitors

As government leaders consider the challenges of e-Government, it is imperative to develop capabilities to provide a secure ICT infrastructure and make investments to address cyber security. By using the Internet as the communication medium to connect the public to government services, e-Government systems are exposed to security vulnerabilities. The Internet and wireless technologies extend the boundaries of government ministries, opening the way for computer viruses and attacks, fraud and computer crimes, hackers to threaten the security and reliability of computer systems. Human are the greatest source of vulnerability to a computer system. Breaches in computer systems also happen from employees working inside of an organization. Human error may occur in various situations ranging from data entry, system analysis design mistakes, programming and implementation. Additionally, computer systems are vulnerable to unintentional threats such as

environmental hazards including earthquakes, tsunamis, power failures, hurricanes and fires. To provide appropriate ICT security for an e-Government system, government ministries should develop a security strategy and a disaster recovery plan. The objectives of the security strategy are detailed in Figure 15 and should include the following:

Figure 15 - E-Government Security Strategy

Defense Strategy	Objective
<i>Prevention and deterrence</i>	<ul style="list-style-type: none"> • Implement controls to prevent human errors from occurring (e.g. prevent data entry errors, file manipulation, unauthorized access to data) • Deter attacks to system • Use diagnostic software to recognize system attacks • Carry-out procedures to investigate possible attacks proactively • Once an attack or malfunction occurs, get system back in operation as quick as possible • Implement procedures to permit operation in a degraded mode until a full system recovery is made • Consider keeping very sensitive data completely offline • Develop a recovery plan that explains how to fix a damage system as quickly as possible • This includes developing a formal disaster recovery plan • Find the causes of the vulnerabilities to systems • Correct the causes to prevent from occurring again • Educate all employees and other stakeholders (e.g. vendors, subcontractors, consultants) about computer security hazards • Develop procedures to enforce compliance of security rules and regulations
<i>Detection</i>	
<i>Limitation of damage</i>	
<i>Recovery</i>	
<i>Correction</i>	
<i>Awareness and compliance</i>	

Source: (Turban, Leidner et al. 2008)

10.2. Conclusion

In conclusion, the obstacles for transforming governments to make opportunities for citizens to realize their full human potential are great for developing countries. This report sheds light to many of the nuances of designing, building and implementing e-Government services and may create opportunities to develop new approaches to help the lives of people improve by making governments serve the public more effectively.

The issue for helping developing countries move forward is not necessarily prescribing what level of functionality its e-Government services should have, but rather the task is: given the level of e-Government that a government chooses to achieve, what is the most appropriate approach to manage the process of assimilating the e-Government service to best meet the needs of its citizenry? e-Government studies and reports that look at which factors shape the adoption of e-Government assume that the simple awareness of the innovation is sufficient for the government to be successful. Subsequently, any policies or loan programs that measure performance or outcomes based on the adoption of e-Government take a perspective of technological determinism. In other words, it is the belief that technology will change behaviors directly. Indeed, there are numerous e-Government initiatives where the underlying assumption is that “if we build it, they will come.” The problem is, however, ICTs do not operate in isolation. As Professor Rob Kling, a seminal scholar of social informatics (e.g. the social impact of ICTs), noted that for ICTs, it’s “their “cultural and institutional contexts” that matter. So the concern for helping developing countries with e-Government should focus on understanding the how to adjust global practices for e-Government to local conditions, norms and customs. ICTs do offer great promise, but great effort is needed to overcome the considerable challenges that developing countries face. It is a feasible task and as each new person gets on the Internet and more governments from developing countries grow more comfortable and capable to provide services online, new opportunities to help each person to achieve his or her full human development potential will be realized.

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