Academy of ICT Essentials for Government Leaders

Module 3

e-Government Applications

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APCICT ASIAN AND PACIFIC TRAINING CENTRE FOR INFORMATION AND COMMUNICATION TECHNOLOGY FOR DEVELOPMENT

The Academy of ICT Essentials for Government Leaders Module Series

Module 3: e-Government Applications

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FOREWORD

The 21st century is marked by the growing interdependence of people in a globalizing world. It is a world where opportunities are opening up for millions of people through new technologies, expanding access to essential information and knowledge which could significantly improve people's lives and help reduce poverty. But this is possible only if the growing interdependence is accompanied by shared values, commitment and solidarity for inclusive and sustainable development, where progress is for all people.

In recent years, Asia and the Pacific has been 'a region of superlatives' when it comes to information and communication technologies (ICTs). According to the International Telecommunication Union, the region is home to over two billion telephones and 1.4 billion mobile phone subscribers. China and India alone accounted for a quarter of all mobile phones in the world by mid-2008. The Asia Pacific region also represents 40 per cent of the world's Internet users and the largest broadband market in the world with a share of 39 per cent of the global total.

Against this background of rapid technological advancement, many have wondered if the digital divide will disappear. Unfortunately, the response to this question is 'not yet'. Even five years after the World Summit on the Information Society (WSIS) was held in Geneva in 2003, and despite all the impressive technological breakthroughs and commitments of key players in the region, access to basic communication is still beyond the vast majority of people, especially the poor.

More than 25 countries in the region, mainly small island developing countries and land-locked developing countries, have less than 10 Internet users per 100 persons, and these users are mostly concentrated in big cities, while on the other hand, some developed countries in the region have a ratio of more than 80 Internet users per 100. Broadband disparities between the advanced and developing countries are even more striking.

In order to bridge the digital divide and realize ICT potentials for inclusive socio-economic development in the region, policymakers in developing countries will need to set priorities, enact policies, formulate legal and regulatory frameworks, allocate funds, and facilitate partnerships that promote the ICT industry sector and develop ICT skills among their citizens.

As the Plan of Action of the WSIS states, "… each person should have the opportunity to acquire the necessary skills and knowledge in order to understand, participate in, and benefit from the Information Society and Knowledge Economy." To this end, the Plan of Action calls for international and regional cooperation in the field of capacity building with an emphasis on creating a critical mass of skilled ICT professionals and experts.

It is in response to this call that APCICT has developed this comprehensive ICT for development training curriculum – the *Academy of ICT Essentials for Government Leaders* – consisting presently of eight stand-alone but interlinked modules that aim to impart the essential knowledge and expertise that will help policymakers plan and implement ICT initiatives more effectively.

APCICT is one of five regional institutes of the United Nations Economic and Social Commission of Asia and the Pacific (ESCAP). ESCAP promotes sustainable and inclusive socio-economic development in Asia and the Pacific through analysis, normative work, capacity building, regional cooperation and knowledge sharing. In partnership with other UN agencies, international organizations, national partners and stakeholders, ESCAP, through APCICT, is committed to support the use, customization and translation of these *Academy* modules in different countries, and their regular delivery at a series of national and regional workshops for senior- and mid-level government officials, with the objective that the built capacity and acquired knowledge would be translated into increased awareness of ICT benefits and concrete action towards meeting development goals.

Noeleen Heyzer

Under-Secretary-General of the United Nations
and Executive Secretary of ESCAP

PREFACE

The journey in developing the *Academy of ICT Essentials for Government Leaders Module Series* has truly been an inspirational eye-opening experience. The *Academy* has not only served to fill a gap in ICT capacity building, but has also paved a new way for curriculum development – through people's participation and ownership of the process.

The *Academy* is the flagship programme of APCICT, which has been developed based on: results of a comprehensive needs assessment survey involving over 20 countries in the region and consultations with government officials, members of the international development community, and academics and educators; in-depth research and analysis of the strengths and weaknesses of existing training materials; feedback from participants in a series of APCICT-organized regional and sub-regional workshops on the usefulness and relevance of the module content and the appropriate training methodology; and a rigorous peer review process by leading experts in various ICT for development (ICTD) fields. The *Academy* workshops held across the region provided an invaluable opportunity for the exchange of experiences and knowledge among participants from different countries, a process that has made the *Academy Alumni* key players in shaping the modules.

The national roll-out of eight initial *Academy* modules marks the beginning of a vital process of strengthening existing partnerships and building new ones to develop capacity in ICTD policymaking across the region. APCICT is committed to providing technical support in rolling out the *National Academies* as its key approach towards ensuring that the *Academy* reaches all policymakers. APCICT has also been working closely with a number of regional and national training institutions that are already networked with central-, state- and local-level governments, to enhance their capacity in customizing, translating and delivering the *Academy* modules to take national needs and priorities into account. There are plans to further expand the depth and coverage of existing modules and develop new ones.

Furthermore, APCICT is employing a multi-channel approach to ensure that the *Academy* content reaches wider audiences in the region. Aside from the face-to-face delivery of the *Academy* via regional and national *Academies*, there is also the APCICT Virtual Academy (AVA), the *Academy's* online distance learning platform, which is designed to enable participants to study the materials at their own pace. AVA ensures that all the *Academy* modules and accompanying materials, such as presentation slides and case studies, are easily accessible online for download, re-use, customization and localization, and it encompasses various functions including virtual lectures, learning management tools, content development tools and certification.

The initial set of eight modules and their delivery through regional, sub-regional and national *Academy* workshops would not have been possible without the commitment, dedication and proactive participation of many individuals and organizations. I would like to take this opportunity to acknowledge the efforts and achievements of the *Academy Alumni* and our partners from government ministries, training institutions, and regional and national organizations who participated in the *Academy* workshops. They not only provided valuable input to the content of the modules, but more importantly, they have become advocates of the *Academy* in their country, resulting in formal agreements between APCICT and a number of national and regional partner institutions to customize and deliver regular *Academy* courses in-country.

I would also like to add a special acknowledgment to the dedicated efforts of many outstanding individuals who have made this extraordinary journey possible. They include Shahid Akhtar, Project Advisor of the *Academy*; Patricia Arinto, Editor; Christine Apikul, Publications Manager; all the *Academy* authors; and the APCICT team.

I sincerely hope that the *Academy* will help nations narrow ICT human resource gaps, remove barriers to ICT adoption, and promote the application of ICT in accelerating socio-economic development and achieving the Millennium Development Goals.

Hyeun-Suk Rhee

Director
UN-APCICT

ABOUT THE MODULE SERIES

In today's 'Information Age', easy access to information is changing the way we live, work and play. The 'digital economy', also known as the 'knowledge economy', 'networked economy' or 'new economy', is characterized by a shift from the production of goods to the creation of ideas. This underscores the growing, if not already central, role played by information and communication technologies (ICTs) in the economy and in society as a whole.

As a consequence, governments worldwide have increasingly focused on ICTs for development (ICTD). For these governments, ICTD is not only about developing the ICT industry or sector of the economy but also encompasses the use of ICTs to engender economic as well as social and political growth.

However, among the difficulties that governments face in formulating ICT policy is that policymakers are often unfamiliar with the technologies that they are harnessing for national development. Since one cannot regulate what one does not understand, many policymakers have shied away from ICT policymaking. But leaving ICT policy to technologists is also wrong because often technologists are unaware of the policy implications of the technologies they are developing and using.

The *Academy of ICT Essentials for Government Leaders* module series has been developed by the United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (UN-APCICT) for:

1. Policymakers at the national and local government level who are responsible for ICT policymaking;

2. Government officials responsible for the development and implementation of ICT-based applications; and

3. Managers in the public sector seeking to employ ICT tools for project management.

The module series aims to develop familiarity with the substantive issues related to ICTD from both a policy and technology perspective. The intention is not to develop a technical ICT manual but rather to provide a good understanding of what the current digital technology is capable of or where technology is headed, and what this implies for policymaking. The topics covered by the modules have been identified through a training needs analysis and a survey of other training materials worldwide.

The modules are designed in such a way that they can be used for self-study by individual readers or as a resource in a training course or programme. The modules are standalone as well as linked together, and effort has been made in each module to link to themes and discussions in the other modules in the series. The long-term objective is to make the modules a coherent course that can be certified.

Each module begins with a statement of module objectives and target learning outcomes against which readers can assess their own progress. The module content is divided into sections that include case studies and exercises to help deepen understanding of key concepts. The exercises may be done by individual readers or by groups of training participants. Figures and tables are provided to illustrate specific aspects of the discussion. References and online resources are listed for readers to look up in order to gain additional perspectives.

The use of ICTD is so diverse that sometimes case studies and examples within and across modules may appear contradictory. This is to be expected. This is the excitement and the challenge of this newly emerging discipline and its promise as all countries begin to explore the potential of ICTs as tools for development.

Supporting the *Academy* module series in print format is an online distance learning platform — the APCICT Virtual Academy (AVA – http://www.unapcict.org/academy) — with virtual classrooms featuring the trainers' presentations in video format and PowerPoint presentations of the modules.

In addition, APCICT has developed an e-Collaborative Hub for ICTD (e-Co Hub – http://www.unapcict.org/ecohub), a dedicated online site for ICTD practitioners and policymakers to enhance their learning and training experience. The e-Co Hub gives access to knowledge resources on different aspects of ICTD and provides an interactive space for sharing knowledge and experiences, and collaborating on advancing ICTD.

MODULE 3

The module provides an overview of e-government, including key elements and concepts, principles and types of applications. It discusses how an e-government system is built by providing detailed analyses of exemplar systems and identifying design considerations.

Module Objectives

This module aims to:

1. Provide an overview of the key elements of e-government;

2. Describe and provide examples of types of e-government services; and

3. Discuss important success factors as well as barriers to achieving success in e-government services.

Learning Outcomes

After going through this module, readers should be able to:

1. Discuss how ICT applications can improve the way government works;

2. Describe various ICT applications in various areas of government; and

3. Analyse the factors that lead to success or failure of specific e-government applications.

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Acronyms

APCICT	Asian and Pacific Training Centre for Information and Communication Technology for Development
APDIP	Asia-Pacific Development Information Programme
ASYCUDA	Automated System for Customs Data
AusAID	Australian Agency for International Development
B2B	Business-to-Business
B2C	Business-to-Citizen
B2G	Business-to-Government
BOC	Bureau of Customs, Philippines
BPR	Business Process Reengineering
CIC	Community Information Centre, Bangladesh
EDI	Electronic Data Interchange
eRPTS	Electronic Real Property Tax System, Philippines
ESCAP	Economic and Social Commission for Asia and the Pacific
FOSS	Free and Open Source Software
G2B	Government-to-Business
G2C	Government-to-Citizen
G2G	Government-to-Government
GAIS	Government Administration Information System, Cambodia
GoAP	Government of Andhra Pradesh, India
ICT	Information and Communication Technology
ICTD	Information and Communication Technology for Development
IDRC	International Development Research Centre, Canada
ILC	Internet Learning Centre, Bangladesh
INV	Information Network Village, Republic of Korea
ISP	Information Strategy Planning
IT	Information Technology
KADO	Korea Agency for Digital Opportunity and Promotion
KMS	Knowledge Management System
LAN	Local Area Network
LGU	Local Government Unit, Philippines
MOGAHA	Ministry of Government Administration and Home Affairs, Republic of Korea
MOPAS	Ministry of Public Administration and Security, Republic of Korea
NCA	National Computerization Agency, Republic of Korea
NCC	National Computer Center, Philippines
NDMS	National Disaster Management System
NGO	Non-Governmental Organization

NIA	National Information Society Agency, Republic of Korea
NRI	National Resource Institution, India
NTS	National Tax Service
OECD	Organisation for Economic Co-operation and Development
PC	Personal Computer
PFnet	People First Network
RIC	Rural ICT Centre, Bangladesh
RTC	Rural Technology Centre, Bangladesh
SME	Small and Medium Enterprise
TV	Television
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNOPS	United Nations Office for Project Services
WHO	World Health Organization

List of Icons

Case Study


Questions To Think About


Something To Do

Test Yourself

1. OVERVIEW OF ICT APPLICATIONS

1.1 Defining e-Government

e-Government can be broadly defined as the application of information and communication technologies (ICTs) to enhance the performance of traditional government functions and services. More specifically, e-government is "the use of digital technologies to transform government operations in order to improve effectiveness, efficiency and service delivery."[1]

e-Government is not a single event in a short period of time but a long-term evolutionary process of transforming government to focus on citizen services. Thus, it is necessary to establish a high-level e-government roadmap (top-down design) with a bottom-up detailed implementation plan. Module 2 in the *Academy of ICT Essentials for Government Leaders* module series discusses the vision and strategy for establishing an e-government roadmap. This module discusses bottom-up implementation.

The purpose of e-government is *more effective* delivery of government services to citizens. Generally, the more services are available online and the more widespread the use of these services, the greater will be the impact of e-government. Thus, e-government requires a critical mass of e-citizens and e-businesses to generate sustainable impact beyond internal efficiency and transparency of government. However, achieving this critical mass is not easy. A World Bank study of the importance of making more online services accessible to e-citizens and e-businesses, for example, found that:

> Many countries who pioneered e-government programs 5-10 years ago soon realized that the level of public participation in and usage of e-government services remained quite low despite substantial public investment on the supply side, which succeeded in making government services available online.[2]

e-Government will only be successful if there is strong demand and support for it from the majority of the population. Some of this demand will come from better awareness of the opportunities offered by better and faster government service delivery. Citizens and businesses also need to be motivated to use e-government services through the provision of compelling, relevant and accessible digital content. In particular, the following must be implemented to increase demand and support for e-government services:

1 Mark Forman, *e-Government: Using IT to transform the effectiveness and efficiency of government* (2005), 4, http://siteresources.worldbank.org/INTEDEVELOPMENT/Resources/FormanEgov(6_05).ppt.

2 World Bank, *e-Government for All – Review of International Experience with Enhancing Public Access, Demand and Participation in e-Government Services: Toward a Digital Inclusion Strategy for Kazakhstan*, ISG e-Government Practice Technical Advisory Note (Draft version 30 June 2006), 11.

- Develop a multi-channel single-window common service delivery infrastructure, including 'physical' citizen service centres and other public access points such as telecentres, call centres, Web portals and mobile portals;
- Implement measures that will enhance public trust in ICT-enabled transactions and all other interactions in the digital environment;
- Encourage the development of relevant, compelling, user-friendly online and mobile content, including so-called 'killer applications'; and
- Implement programmes aimed at improved accessibility and affordability of online and mobile content and ICT.

Something To Do

1. Identify one e-government service that would generate strong demand and support from citizens and businesses in your country. List the reasons why you think this service would be popular.
2. Identify one e-government service that is not as popular as the example you cite in #1 above and list specific ways of motivating citizens and businesses in your country to use or to participate in such a service.

The following four objectives can be achieved when e-government projects are implemented successfully:

- Online government service
- A paperless government
- A knowledge-based government
- A transparent government

To achieve these four objectives, e-government at the federal, state and local level must be built. There are three major tasks at each of these levels of government: a) innovating citizen services (G2C); b) innovating business services (G2B); and c) innovating the way government works (G2G).

The discussion below of ICT applications for innovating citizen services (G2C), business services (G2B) and the way government works (G2G) uses the Republic of Korea's e-Government Plan as the main illustrative case. The Republic of Korea ranked sixth in the 2008 United Nations e-Government Readiness Index, which is a composite of a Web measure index, telecommunication infrastructure index and human capital index. It measures the 'government-to-citizen' (G2C) and 'government-to-government' (G2G) aspects of e-government. The 2008 survey also captures some elements of 'government-to-business' (G2B).

1.2 Innovating Citizen Services (G2C) and Business Services (G2B) (Front-Office Delivery)

G2C services include information dissemination to the public and basic citizen services while G2B transactions include various services exchanged between government and the business community.

ICT-supported or electronic G2C services are characterized by a government-wide information sharing system and new Internet-based applications that allow citizens to access information and other services using a single-window online portal. Such a portal can provide the following citizen services:

- Processing and issuance of various permits/authorizations and certificates
- Information on legislative/administrative notices and relevant laws
- Payment services, including tax refunds and social welfare payments
- An opportunity to participate in government administration by requesting public hearings and casting electronic votes

To establish a citizen portal and public information sharing system, databases in resident registration, real estate, vehicle, tax and insurance will need to be integrated.

Electronic G2B service delivery takes the form of a one-stop single-window service for businesses. The services covered include corporate civil administrative affairs, industrial information and electronic transaction services such as procurements, bids and awards, and payment services for various taxes and public charges. Effective electronic G2B delivery requires the following ICT applications:

- An integrated e-procurement system — i.e. a single-window government procurement system in which all procurements-related processes, such as registration, tender, contract and payment, are done through the Internet
- An e-customs system that would streamline customs administration in the import and export industry and establish effective smuggling interdiction
- e-Commerce to support the buying and selling of goods and services online

These applications are discussed in more detail in Section 2.

Test Yourself

Using the definitions given above as well as your personal knowledge of government services, decide which of the following are examples of G2C services and G2B services.

1. Tax services, such as filing and payment of tax returns
2. Procurement services, including tenders, bids and awards
3. Social insurance services: medical, national pension, employment and accident compensation insurance
4. Registration and tracking of resident citizens
5. Business registration
6. Real estate information management
7. Vehicle administration system

1.3 Innovating the Way Government Works (G2G) (Back-Office Delivery)

Electronic G2G delivery aims to reform government's internal work processes to improve efficiency. More specifically, reforming government work processes using ICT is expected to have the following outcomes:

- The reporting systems of central and local governments are connected, resulting in increased accuracy.
- There is information sharing among agencies in the form of database sharing. This improves efficiency.
- Government agencies exchange ideas and resources.
- Collaborative decision-making is made possible through video conferencing.

Digitizing document processing in government agencies and moving to paperless government operations is a key G2C initiative. e-Document exchange is expected to ensure efficiency, security and reliability in administration.

The following are examples of G2G services in the Republic of Korea.

Integrated National Finance Information System: Real-time management of national fiscal activities by interconnecting 23 finance-related systems that are operating independently in various government agencies.

Local e-Government Information System: Informatization of 232 local government administrative affairs, such as resident registration and real estate, finance, and tax at the city, county and district levels.

Education Information System and e-Learning: A nationwide information network among schools, provincial offices of education and their sub-agencies, and the Ministry of Education and Human Resources Development.

Government e-Document Exchange: e-Processing, including preparation, approval, distribution and storage, of all governmental documents.

G2C systems require the following:

- Establishing electronic work processes
- Electronic document processing
- Knowledge management system

These are discussed in more detail in Sections 2 and 3.

Something To Do

Identify aspects of your agency's work process that need to be improved. State how ICTs can be used to improve your agency's work process.

1.4 Benefits of Successful ICT Implementation in Government

Table 1 shows what are thought to be beneficial changes to government work processes that come from effective ICT-supported reform.

Table 1. Changes in government work processes from e-government

From	To
Paper-based government work processes	Electronic-based document processes
Department-oriented procedures	Service-oriented procedures
Many government contact points and personal (face-to-face) visits to government offices	A single contact point and online access, making personal visits to government offices unnecessary
Department-level information resource management, with a lot of duplication and redundancy among different departments	Government-wide information resource management using a common standard and characterized by convergence

These changes improve efficiency, transparency and accountability in government by reducing transaction times and removing redundant layers of bureaucracy. In addition, e-government helps build trust between government and citizens because it increases direct interaction between government offices and citizens, and makes the same information universally and freely available.

Finally, introducing ICT can make governance reform easier. As use of ICT has spread rapidly throughout Asian societies, centralized and bureaucratic government organizations face new demands and competitive pressures from citizens and the business community. In general, e-government projects increase the perception among citizens and businesses that the government is modernizing and moving forward.

Questions To Think About

In your context, are all of the changes brought about by ICT applications in government beneficial? Are there occasions when e-government initiatives are not perceived in a positive way by citizens? Describe these occasions.

1.5 Critical Success Factors

In e-government implementation, the critical factors for success may be grouped into five major areas:

Figure 1. Critical success factors in e-government implementation

(Source: Soh Bong Yu, "e-Government of Korea: How we have been working with it" (KADO presentation), 25, https://www.kado.or.kr/koil/bbs/board_view.asp?config_code=362&offset=0&board_code=3246)

Vision, objectives and strategy

A long-term plan with a clearly articulated vision and strategy is vital to the implementation of e-government. A quick fix or piecemeal approach will not work. The more effective approach is to think big and have a big picture (top-down design), but to start small and prioritize tasks (bottom-up) during the implementation process.

In sum, successful e-government requires:

- A clear vision by the leaders
- Strong support from citizens
- Agenda setting

Laws and regulations

It is important to plan for sufficient time and effort for legislative changes that may be required to support the implementation of new processes. The following laws need to be in place for e-government to succeed:

- Law on privacy and related issues
- Law related to changes in business processes and information systems
- Law regarding the government information technology architecture and establishing an integrated computing centre

Organizational structure

The effort required in this area should not be underestimated. Organizational restructuring typically makes up between 30 and 50 per cent of total effort. Change in organization structures must be well planned and implemented in a systematic manner.

The following are important in effecting organizational change:

- Strong leadership with commitment
- Planning – IT management and change management
- Budget preparation and budget execution
- Coordination and collaboration
- Monitoring and performance measurements
- Government-private sector-citizen partnership

Business process

The existing way of doing business may not necessarily be the most appropriate or effective. One of the tools to do business process innovation is Business Process Reengineering (BPR). BPR involves redesigning the work flow within or between department levels to increase process efficiency (i.e. to eliminate inefficiency in the work process).

Information technology

Information technology changes rapidly. Factors to consider when choosing technology and vendors are:

- Level of application technologies required
- Network infrastructure
- Interoperability
- Standardization
- Technical and human resource capabilities

Something To Do

If your country has an e-government plan, review the plan using the checklist of critical success factors discussed in this section.

1.6 Risk Factors in e-Government Deployment

It is widely believed that e-government implementation in many countries has failed to meet high expectations. One study shows that 35 per cent of e-government programmes around the world have failed, 50 per cent are partial failures and only 15 per cent can be considered successful.[3]

Factors leading to failure of e-government deployment in developing countries include:

- Lack of agreement within the public administration system – Internal resistance by government
- Inadequate plans and strategies – e-Government is introduced in a piecemeal and unsystematic fashion
- Lack of adequate human resources – Insufficient institutional and human capacity building
- Absence of an investment plan
- Shortage of IT and system suppliers
- Immature technologies – Overemphasis on technology or technology-oriented deployment)
- Rapid implementation without adequate testing and preparation

The most important challenge is recognizing that no one solution fits every situation. Countries in Asia and the Pacific are characterized by vastly different political, economic, social and governance contexts, necessitating different approaches.

Something To Do

Think of an e-government initiative or project of your government that has failed or achieved only partial success. Describe the project and explain the reasons why it failed.

3 National Information Society Agency, “Bridging Asia through e-Government” (Asia e-Government Forum 2007, Seoul, Republic of Korea, 20 September 2007).

1.7 Future e-Government

Rapid advances in technology provide a range of options for e-government deployment. New technologies have the potential to provide better services to citizens and businesses. Thus, stages of e-government can be identified as shown in Table 2.

Table 2. e-Government development stages in the Republic of Korea

Computerization (Stage 1)	Online (Stage 2)	Integration (Stage 3)	Ubiquitous/Seamless (Stage 4)
1980s to early 1990s	Mid 1990s to 2000	2000 to 2007	Around 2010
Automation	Network	Convergence	Embedded
Database to database	Computer to computer	People to people	Object to object
Separate service	Online service	One-stop service	Seamless/Invisible service

Source: IT Strategy Division, *Korea's IT Strategy and e-Government* (Seoul: National Computerization Agency, 2006).[4]

In the case of the Republic of Korea, stages 1 to 3 were completed in 2007. New technologies such as Broadband Conversion Network and ubiquitous technologies are leading to further development (stage 4). These new developments in the ICT field are discussed in Module 4 (ICT Trends for Government Leaders). In most cases, governments should complete up to stage 3 in order to provide a one-stop service to citizens. Thereafter, new technology can be adopted as the need arises.

4 The National Computerization Agency (NCA) was renamed the National Information Society Agency (NIA) in October 2006.

2. E-GOVERNMENT MODELS, STRATEGY AND ROADMAP

2.1 e-Government Models

Many government organizations have embraced the digital revolution and are putting a wide range of public information and government services online for e-government stakeholders. The stakeholders include:

- Citizens
- Businesses
- Government employees
- Government ministries, department and agencies
- Union leaders
- Community leaders, non-profit organizations
- Politicians
- Foreign investors
- Others

Questions To Think About

1. Is it possible for an individual to belong to different categories of e-government stakeholder?
2. Who or which groups of people would fall under the category of 'others'?

Fang[5] identified eight models of e-government according to type of interaction between stakeholders (see Table 3).

5 Zhiyuan Fang, "e-Government in Digital Era: Concept, Practice, and Development," *International Journal of the Computer, the Internet and Management*, Vol. 10, No. 2 (2002): 1-22, http://www.journal.au.edu/ijcim/2002/may02/article1.pdf.

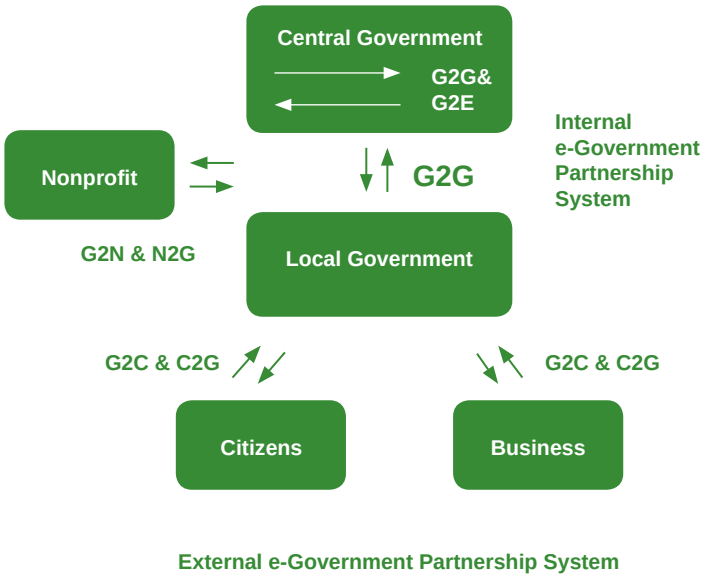
Table 3. e-Government models by type of interaction between stakeholders

e-Government Models	Interaction between Stakeholders
Government-to-Citizen (G2C)	One-way delivery of public services and information by the government to citizens.
Citizen-to-Government (C2G)	Allows for exchange of information and communication between citizens and government.
Government-to-Business (G2B)	Consists of electronic transactions where government provides businesses with the kinds of information they need to transact with government. An example is an e-procurement system.
Business-to-Government (B2G)	Refers to marketing of products and services to government to help government become more efficient through improved business processes and electronic records management for example. An e-procurement system is an application that facilitates both G2B and B2G interactions.
Government-to-Employee (G2E)	Consists of initiatives that will facilitate the management of the civil service and internal communication with government employees. An example is an online human resource management system.
Government-to-Government (G2G)	Allows for online communication and information sharing among government departments or agencies through integrated databases.
Government-to-Non-profit (G2N)	Government provides information to non-profit organizations, political parties and social organizations.
Non-profit-to-Government (N2G)	Allows for an exchange of information and communication between government and non-profit organizations, political parties and social organizations.

Thus, e-government can be said to involve two types of partnerships: internal partnerships and external partnerships (see Figure 2). Internal partnerships are partnerships between and among the branches of government (executive, legislative and judiciary). External partnerships refer to the relationship between government and citizens and businesses.

Figure 2. e-Government partnership systems

(Source: Zhiyuan Fang, "e-Government in Digital Era: Concept, Practice, and Development," *International Journal of the Computer, the Internet and Management*, Vol. 10, No. 2 (2002): 1-22, http://www.journal.au.edu/ijcim/2002/may02/article1.pdf)



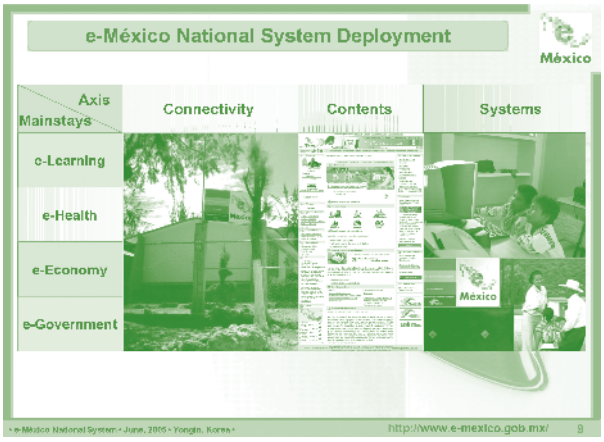
2.2 Priority Areas for e-Government in Developing Countries

Research and documented best practices of various countries suggest that there are three fundamental steps in developing e-government. The first is building connectivity or infrastructure, the second is developing content or applications and the third is systems or integration.

This three-step approach has been adopted by many countries, including Bangladesh, China, Japan, Mexico and the Republic of Korea. In the case of Mexico (see Figure 3), connectivity means addressing the digital divide by providing public access to information technology tools and training by means of Digital Community Centres. Mexico's priorities for the development of content and applications (step 2) are e-learning, e-health, e-economy and e-government. It is also at this step that government websites and portals at department or ministry level are to be developed. The third step for e-Mexico involves integrating or connecting all systems or portal sites to provide one-stop service to citizens and businesses.

Figure 3. e-Mexico national system deployment

(Source: e-Mexico Portal, http://www.e-mexico.gob.mx)



In Fiji and the Solomon Islands, the five components of the e-government plan are: the e-Government Blueprint, e-Government Applications, Government Data Centres, Government Info-Communication Infrastructure, and ICT Competency Development and Training. Eight e-government applications have been identified as follows: e-learning for teachers and students in rural areas, an e-scholarship system, a prison administration system, a crime database, the e-social welfare system, a document management system, customs authority informatization, and a human resource system.[6]

Connectivity is a challenge for developing countries, especially island states. The Solomon Islands has addressed this challenge through an initiative called the People First Network (PFnet).

PFnet

In a remote village named Sasamunga in the island of Choiseul, approximately 1,000 miles away from Honiara, the capital of the Solomon Islands, the people have been communicating with relatives, friends and government departments via e-mail since 2001. This is remarkable because the village does not have electricity or telephone lines. Five years ago, the village's only means of communication to the outside world was letters, which took about 3-4 weeks to reach Honiara (via local shipping). Short wave radio was used in emergency situations.

E-mail without electricity is possible for the people of Sasamunga through the PFnet system established in 2001 as a UNDP-UNOPS project. The system consists of a USD 2,000 laptop computer operated by solar power. E-mail messages typed into the computer are transmitted via high-frequency short-wave radio to a bigger radio receiver at the Internet café in Honiara where an operator receives the e-mail messages and forwards them to the relevant addresses. This is done several times a day, which means that there is constant communication between the rural email station operators and the operator at the Internet café in Honiara.

At each e-mail station, the e-mail messages are 'processed' as follows: A customer brings the message to the station as a handwritten note (usually in pidgin) or verbally dictates the message to the station operator who types the message and then sends it to the Internet café in Honiara. Since the operators at each station perform the functions of typing and sending the messages on behalf of the customers, illiteracy is not a constraint against the use of PFnet services.

PFnet was funded initially by UNDP and over the years it has received funding from AusAID, Japan, the European Union, Great Britain, the New Zealand Official Development Assistance and the People's Republic of China. Now self-sustaining, PFnet is managed by the Rural Development Volunteer Association, a non-governmental organization (NGO) based in Honiara. The network has 14 e-mail stations in the Solomon Islands, or one e-mail station in each of the main islands. Each e-mail station is housed in a small room, usually in a provincial health clinic, community school, or some other accessible and secure public facility.

Source: Adapted from Anand Chand, "e-Government in the South Pacific Region: Case studies from Fiji and Solomon Islands" (paper presented at the Regional Workshop on Asia-Pacific e-Government Initiatives, Bangkok, Thailand, 24-25 April 2006), http://www.apdip.net/projects/e-government/capblg/casestudies/Fiji-Chand.pdf.

6 Anand Chand, "e-Government in the South Pacific Region: Case studies from Fiji and Solomon Islands" (paper presented at the Regional Workshop on Asia-Pacific e-Government Initiatives, Bangkok, Thailand, 24-25 April 2006), http://www.apdip.net/projects/e-government/capblg/casestudies/Fiji-Chand.pdf.

In Bangladesh the strategy for establishing connectivity is the Digital Community Centre of which there are four types: the community information centres (CICs), the rural ICT centres (RICs), the rural technology centres (RTCs) and the Internet Learning Centres (ILCs).[7]

Digital Community Centres in Bangladesh

The CICs in Bangladesh were established in 2006 by Grameen Phone, the largest telecom operator in Bangladesh. Today there are 26 CICs in various parts of Bangladesh. Each is equipped with at least one computer, a printer, a scanner, a webcam and a modem for Internet access using EDGE connectivity. CICs offer the following services for a fee: e-mail, fax, instant messaging and Internet browsing. People use the e-mail services, fax and instant messaging services to keep in touch with friends and relatives abroad. They use the Internet to access government online services, do online research and read online news. The CICs are run as a franchise of Grameen Phone. For a minimum investment of BDT 80,000, local entrepreneurs can own a CIC. There are plans to launch 60,000 CICs across Bangladesh.

The RICs were launched in 2006 by the Digital Equity Network with support from KATALYST, a multi-donor consortium working in Bangladesh. Each RIC has a telephone, computers, a printer and scanner, Internet connectivity and digital cameras. The RICs' vision is to provide information services to micro, small and medium enterprises in rural Bangladesh. In particular, the RICs disseminate business information to local businesses in selected sectors, such as poultry, fisheries and potato farming. The RICs also provide various social, health-related, education and government information.

The RTCs were established in Rajoir, Madaripur and Sarishabari, Jamalpur in 2006 by Practical Action Bangladesh to promote appropriate rural technologies for rural development. Specifically, at the RTCs traditional technologies are upgraded and new technologies are adapted to meet rural needs. Height and weight measurement instruments and other essential agro-processing equipment are available to use in demonstrations and to rent out to the local people. Among these agro-processing equipment are a grain moisture meter, refract meter, pH meter, salinometer, acid titration set, spice grinder, microwave oven, milk cream separator, digital thermometer, blender, mixing tank and sealing machine. Also available are a computer and landline with Internet connection that farmers, traders, entrepreneurs and other clients can use to access information. The RTCs also provide employment information for local unemployed youths, displaced workers and the underemployed.

The ILCs, launched in 2005, are a programme of Relief International School Online. There are now 27 ILCs operating in schools across Bangladesh. Each is equipped with 5-10 computers, one scanner, one digital camera and Internet connectivity. The ILCs provide computer skills training to school children and teachers, as well as training in project-based and collaborative learning. Membership fees are charged to raise funds to cover recurring expenses.

Source: Adapted from Ananya Raihan, *Community Access Points or Telecentre Movement in Bangladesh* (UNPAN e-Government in the Asia and Pacific, 2007), http://ipai.pbwiki.com/f/Annex+_A.pdf.

7 Ananya Raihan, *Community Access Points or Telecentre Movement in Bangladesh* (UNPAN e-Government in the Asia and Pacific, 2007), http://ipai.pbwiki.com/f/Annex+_A.pdf.

Questions To Think About

What strategies for establishing connectivity in rural and remote areas does your country's e-government plan have? If no such strategies are articulated, what strategies would you recommend and why?

2.3 e-Government Strategic Planning

A sound strategy is essential for effective e-government implementation. A strategic plan provides a roadmap for an organization to move from its current state to its desired medium- or long-term future state.

The strategic planning process consists of five steps,[8] which are discussed below. The example used in this section is the e-Government Roadmap of the Republic of Korea.

Step 1: Analyse the present environment.

A SWOT analysis can be used to identify the internal and external factors that are favourable or unfavourable to achieving a particular e-government aim or goal. SWOT stands for **S**trengths, **W**eaknesses, **O**pportunities and **T**hreats.

Step 2: Articulate a vision statement.

A vision statement is a statement that articulates what an organization wants to be. It is future-oriented and serves to inspire members of the organization towards reaching the organization's future desired stated.

For example, the Republic of Korea's e-government vision statement is to become the 'World's Best Open e-Government' by:

- Increasing online public services to 85 per cent;
- Working to be among the top 10 in the world for business support competitiveness;
- Reducing visits for civil service applicants to three visits per year; and
- Raising the utilization rate of e-government programs to 60 per cent.

A vision statement should be clear. And while it states an inspiring ideal, it should also express realistic, achievable aspirations. In addition, it should be aligned with organizational culture and values.

8 Adegboyega Ojo, Elsa Estevez, Bernd Friedrich and Tomasz Janowski, "Strategic Planning for Electronic Governance" (presented at the 7th UNeGov.net School on Foundations of Electronic Governance, Cheonan, Republic of Korea, 9-11 October 2007), http://www.unegov.net/03-Events/26-S-Cheonan/public/module-2.pdf.

Step 3: Refine the vision into goals.

Goals are long-term (three to five years) directions or targets based on the vision.

For example, the Republic of Korea's national goals are as follows:

- Build a democracy with the people.
- Build a society of balanced social growth.
- Contribute to an era of peace and prosperity in northeast Asia.
- Achieve a GNP per capita of USD 20,000. (This goal was achieved in 2007.)

The Republic of Korea's e-government goals are as follows:

- Innovate the way government works.
- Innovate citizen services.
- Innovate information resource management.
- Reform the legal system.

Step 4: Determine strategies to address the findings of the SWOT analysis and achieve specified goals.

Strategies can include specific managerial tasks and measures to achieve a specific goal established in the e-government roadmap. For example, a strategy is the construction of a comprehensive master plan stating how the Government will achieve its objectives. Strategy implementation is the process by which strategies and policies are put into action through the development of programmes, budgets and procedures.

Step 5: Formulate concrete and measurable objectives from strategies.

Objectives are the end results of a planned activity. Objectives should be specific and measurable statements of what is to be accomplished at specific moments. In contrast to an objective, a goal is an open-ended statement of what one wants to accomplish with no quantification of what is to be achieved and no time criterion for completion. An example of an objective is: At least 95 per cent of all businesses will use the G2B system by 2009.

Once completed, the outcome of the strategic planning process should be a detailed plan or roadmap that needs to be communicated to everyone and regularly reviewed to ensure that it remains relevant. The e-Government Roadmap of the Republic of Korea is an example.

The e-Government Roadmap of the Republic of Korea

The Korean government drew up a detailed e-government roadmap after an extensive strategic planning process that included a SWOT analysis, information strategy planning (ISP) and BPR. The process was overseen by a Sub-committee under the Presidential Committee for Government Innovation and Decentralization (or Government Reform Committee).

The roadmap is a five-year plan, covering the period 2003-2007. It specifies four areas, a 10-point agenda and 31 tasks or projects as shown below.

The Republic of Korea's e-Government Agenda and Roadmap

4 Areas of Innovation	10 Agenda	31 Key Projects
1. Innovating the Way Government Works	1. Establishing Electronic Work Processes	1. Electronic Document Processing 2. Consolidated Financial Information System for Central & Local Governments 3. Local e-Government 4. e-Auditing System 5. e-National Assembly 6. Integrated Criminal Justice Services 7. Consolidated Personnel Administration System 8. e-Diplomacy System 9. Real-time System for National Policy Management
	2. Expanding the Administrative Information Sharing System	10. Expansion of Administrative Information Sharing System
	3. Service-oriented Business Process Reengineering	11. Government Business Reference Model Development
2. Innovating Citizen Services	4. Enhancing Citizen Services	12. Enhanced online Citizen Services 13. Integrated National Disaster Management Services 14. Consolidated Architectural Administrative Information System 15. Consolidated Online Tax System 16. Integrated National Welfare Services 17. Consolidated Food and Drug Information System 18. Consolidated Employment Information Services 19. Online Administrative Trial System

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4 Areas of Innovation	10 Agenda	31 Key Projects
	5. Enhancing Business Support Services	20. One-stop Business Support Services (G4B) 21. Consolidated National Logistics Information Services 22. Electronic Trading Services 23. Comprehensive Foreigner Support Services 24. Support for Exporting e-Government Solutions
	6. Enhancing Online Citizen Participation	25. Expansion of Online Citizen Participation
3. Innovating Information Resource Management	7. Consolidating and Standardizing Information Resources	26. Government-wide Consolidated Information Resources Administration System 27. Enhancement of e-Government Communication Network 28. Establishment of Government-wide Information Technology Architecture
	8. Strengthening Information Security Systems	29. Establishment of Information Security System
	9. Strengthening Capacity of IT Personnel and Organizations	30. Restructuring of IT Personnel and Organizations
4. Reforming the Legal System	10. Reforming e-Government Legal System	31. Reform of e-Government Laws and Regulations

Source: National Computerization Agency, *2004 Broadband IT Korea: Informatization White Paper,* 20, http://www.nia.or.kr/special_content/eng/.

Mongolia's roadmap for e-government implementation is given below.

Mongolia's e-Government Roadmap

In 2005 the ICT Authority (ICTA) of Mongolia launched the e-Mongolia National Programme and the e-Government Master Plan of Mongolia.

The e-Mongolia National Programme aims to enhance the people's quality of life by building a new economic environment, improving the country's competitiveness and fostering sustainable development. It has 16 objectives and a plan of action that is being pursued through projects such as 'PC for All' and 'IT Literacy for All Citizens'.

As part of the PC for All Project, government organizations, NGOs and private companies collaborated to establish the Mongolian Internet Service Providers Association and the Mongolia Association of Computer Suppliers Companies. These have reduced the cost of online computing.

In addition, laws have been or are being amended, as outlined in the e-Mongolia National Programme, to provide a favourable legal environment for ICTD. It is not only ICT-related laws that are being revised but also other laws that impact on ICTD. For example, the Law on Education has a clause on developing ICT curricula for secondary schools and ICT specialists.

The e-Government Master Plan of Mongolia was developed following an extensive survey to assess Mongolia's ICT situation and needs, particularly among government organizations. The master plan comes complete with a vision, strategies and plans for implementation, including actions within specific time frames. The vision is to build a strong and competitive country by establishing a citizen-centered, transparent and knowledge-based government through the utilization of advanced ICT.

The 22 projects specified in the master plan focus mostly on the digitization of government information and procedures, providing access to selected information resources and improving public services via the Internet. One project is the Open Government Portal that provides a space for businesses and citizens to comment on policies, laws and regulations, and raise concerns with government organizations. Another project is the Mongolian Taxation Agency's website from which various taxation forms and documents can be downloaded.

Sources: ICTA, *Information and communications technology development in Mongolia – 2006: White paper* (Ulaanbaatar: ICTA, 2006), http://www.itconsulting.mn/publications/WP%20of%20Mongolia%20final.pdf.

Lkhagvasuren Ariunaa, *Mongolia: Mobilizing communities for participation in e-government initiatives for the poor and marginalized* (Bangkok: UNDP-APDIP, 2005), http://www.apdip.net/projects/e-government/capblg/casestudies/Mongolia-Ariunaa.pdf.

Lkhagvasuren Ariunaa and Batchuluun Batpurev, ".mn Mongolia," in *Digital Review of Asia Pacific 2007/2008* (New Delhi: Sage, IDRC, Orbicom, 2007), http://www.idrc.ca/en/ev-127135-201-1-DO_TOPIC.html.

Odgerel Ulziikhutag, *Mongolia: e-Government Key Challenges to Enhance Citizen Participation* (Bangkok: UNDP-APDIP, 2005), http://www.apdip.net/projects/e-government/capblg/casestudies/Mongolia-Ulziikhutag.pdf.

Something To Do

1. Does your government have an e-government roadmap or an ICT Plan? Find out and describe the process through which the roadmap or plan was formulated. How similar or different is this process from the strategic planning described above?
2. If your government does not yet have an e-government roadmap or ICT Plan, write a brief analysis in which you identify the steps in the strategic planning process that would be particularly challenging for your government and indicate reasons why. Identify also who you think should be involved in the strategic planning process to come up with your country's e-government roadmap.

2.4 e-Government Implementation and Assessment

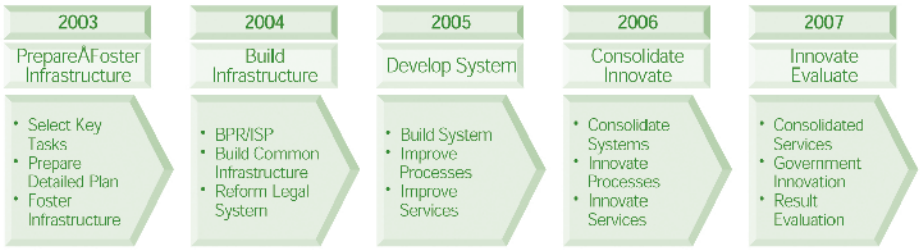
The successful implementation of e-government depends on the performance of each task or project in the e-government roadmap.

In the case of the Republic of Korea, the Ministry of Government Administration and Home Affairs (MOGAHA)[9] established guidelines for project management and announced the guidelines as a published ruling (No. 142, March 30, 2004). MOGAHA also assigned the National Computerization Agency (NCA)[10] to manage the projects. Two pillars are promoting the implementation of e-government: the e-government support project and the administrative database construction project. The e-government support project, which prioritizes support for Roadmap tasks, assists projects involving multiple ministries, new policy projects or local informatization projects within the allocated budget and guidelines for each year.

The Korean e-Government Roadmap projects are undertaken by stages as shown in Figure 4.

Figure 4. Annual plan for the Republic of Korea's e-Government Roadmap implementation

(Source: NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 11, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651)



9 During the government reorganization implemented in February 2008, MOGAHA was renamed the Ministry of Public Administration and Security (MOPAS).

10 The NCA was renamed the National Information Society Agency (NIA) in October 2006.

From 2004 until June 2006 an estimated USD 516 million has been invested in 137 e-government promotional tasks, including 105 e-Government Roadmap sub-projects.[11]

The Republic of Korea was ranked sixth in the world in the 2008 UN e-Government Survey,[12] with a total composite index of 0.8317. The UN Survey consists of three areas: a) Web Measure Index; b) Telecommunication Infrastructure Index; and c) Human Capital Index. The Web Measure Index, which measures the online presence of government agencies, provides UN Member States with a comparative ranking on their ability to deliver online services to their citizens. The Republic of Korea's Web Measure Index in the UN survey is 0.8227.

Box 1. The UN Web Measure Index

Stage I – Emerging
A government's online presence consists mainly of a Web page and/or an official website. Links to ministries or departments of education, health, social welfare, labour and finance may or may not exist. Much of the information is static and there is little interaction with citizens.

Stage II – Enhanced
The government provides more information on public policy and governance. There are links to archived information (e.g. documents, forms, reports, laws and regulations, newsletters) that are easily accessible to citizens.

Stage III – Interactive
The government delivers online services, such as downloadable forms for tax payments and applications for license renewals. In addition, an interactive portal or website with services designed to make transacting with government convenient for citizens, is being started.

Stage IV – Transactional
The government begins to transform itself by introducing two-way interaction between citizen and government. It includes options for paying taxes, applying for ID cards, birth certificates and passports, renewing licenses, and other G2C interactions, and allows the citizen to access these services online 24/7. All transactions are conducted online.

Stage V – Connected
The government transforms itself into a connected entity that responds to the needs of its citizens by developing an integrated back-office infrastructure. This is the most sophisticated level of online e-government. It is characterized by:

1. Horizontal connections (among government agencies)
2. Vertical connections (central and local government agencies)
3. Infrastructure connections (interoperability)
4. Connections between governments and citizens
5. Connections among stakeholders (government, private sector, academic institutions, NGOs and civil society)

In addition, e-participation and citizen engagement are supported and encouraged by governments in the decision-making process.

Source: Abridged from United Nations, *United Nations e-Government Survey 2008: From e-Government to Connected Governance* (New York: United Nations, 2008), http://unpan1.un.org/intradoc/groups/public/documents/UN/UNPAN028607.pdf.

11 NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 11, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651.
12 United Nations, 2008, *United Nations e-Government Survey 2008: From e-Government to Connected Governance* (New York: United Nations, 2008), http://unpan1.un.org/intradoc/groups/public/documents/UN/UNPAN028607.pdf.

The Telecommunication Infrastructure Index measures infrastructure capacity to deliver e-government services, including teledensity for both fixed and mobile phones, number of personal computers, number of Internet users, and broadband access. The Republic of Korea's telecommunication infrastructure index in 2008 was 0.6886.

The Human Capital Index combines the adult literacy rate and the gross enrolment rations for primary, secondary and tertiary education. The Republic of Korea's Human Capital Index was a very high 0.9841.

2.5 e-Government Budget

As indicated in Figure 5, the ICT budget should be treated differently from the traditional budget. Normally the ICT budget is considered as a long-term capital investment rather than a short-term expenditure. Funding for ICT implementation may be obtained using various methods. One of these methods is public-private partnerships, which is discussed in Module 8 of the *Academy of ICT Essentials for Government Leaders* module series.

Figure 5. Traditional budget and ICT investments

Traditional Budget	ICT Investments
Single-year Expenditure	Multi-year Investments
Programme by Programme Performance	Cross-Boundary Performance
Financial Costs / Benefits	Financial and Non-Financial Costs/Benefits
Level of Effort within Existing Work Flows	Changes in the Flow of Work
Ongoing Operations	Setup Operations
Control	Innovations

Possible Solution

- Classified as Capital Investment
- Separate Approval by e-Government Coordinating Office
- Public-Private Partnership
- Funding for Innovation
- Assessment of Costs and Benefits

In the Republic of Korea the budget for informatization in 2006 was USD 3.4 billion, of which approximately USD 917 million (26.7 per cent) was intended for e-government implementation and USD 9.5 million (2.8 per cent) for narrowing the digital divide. The budget was to be allocated in terms of priority areas or areas that would achieve substantial results, such as reducing paper-based documents and savings in administrative and social costs.[13]

Since 2005, the Republic of Korea's e-government budget has been transferred from the ICT promotion fund to the general account, and the budget for each Roadmap project is executed by the NCA (later renamed NIA) after coordination by MOGAHA (later renamed MOPAS) and deliberation by a committee.

13 NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 10, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651.

Something To Do

If your government has an e-government roadmap or plan:

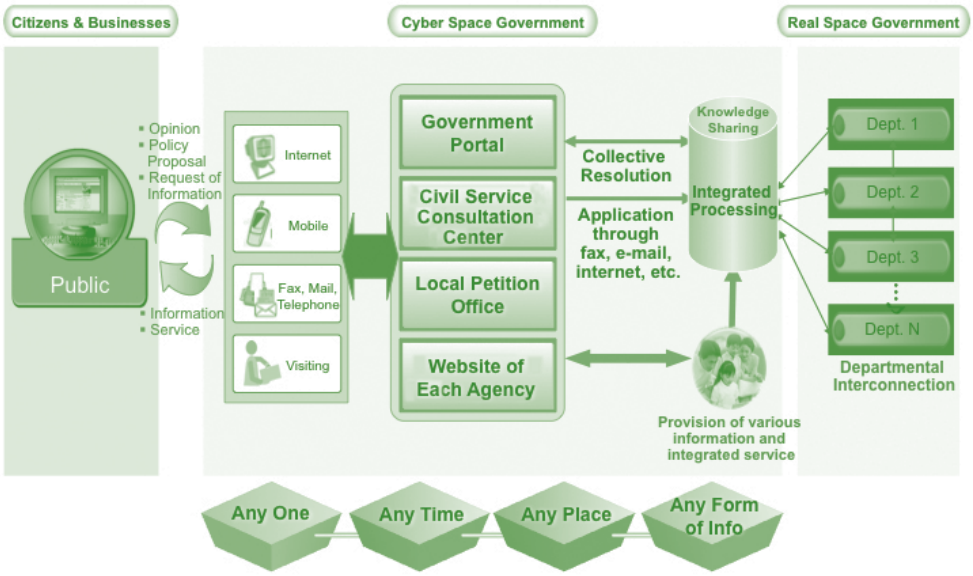
1. Find out whether there is an implementation plan and analyse its strengths and weaknesses.
2. Find out what the budget is for implementing the e-government roadmap or plan, how this budget is allocated and what the funding sources are. Indicate whether you think the budget plan is adequate, and the reasons for your assessment.

3. TYPES OF ICT APPLICATIONS AND IMPLEMENTATION

As mentioned in the previous section, three areas of ICT applications — Innovating Citizen Services (G2C), Innovating Business Services (G2B) and Innovating the Way Government Works (G2G) — will be discussed in detail. Most of the examples are drawn from the Korean e-government experience. Figure 6 shows the conceptual framework for e-government in Korea. It shows multi-channel access to a single window, the types of integrated services provided, and the back-end of each departmental level connection and data integration.

Figure 6. Conceptual framework of e-government in the Republic of Korea[14]

(Source: Soh Bong Yu, "e-Government of Korea: How we have been working with it" (KADO presentation), 5, https://www.kado.or.kr/koil/bbs/board_view.asp?config_code=362&offset=0&board_code=3246)



3.1 Government-to-Citizen (G2C) Applications

Online citizen service (G2C portal)

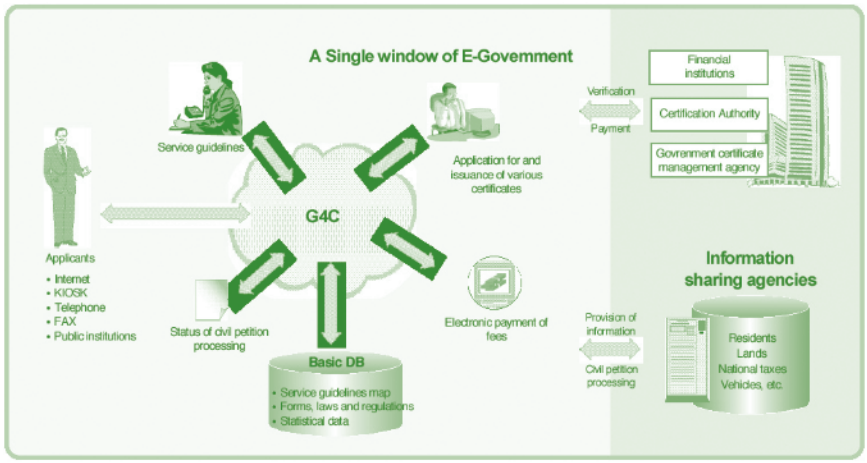
Inefficiency in government administration has been traced to the existence of separate national databases, such as those for residents, land titles, vehicles and taxes. Having separate databases means that citizens have to make redundant registrations, go through a lot of paperwork for various certifications and make multiple visits to government agencies. To improve administrative efficiency and productivity, a system for connecting major national

14 Since the new Korean government took office on 25 February 2008 the Government organization has been restructured. The Ministry of Information and Communication has been merged with the Ministry of Public Administration and Security (MOPAS) and the Ministry of Government Administration and Home Affairs (MOGAHA) has been renamed the Ministry of Public Administration and Security (MOPAS, http://www.mopas.go.kr). The National Computerization Agency (NCA) was renamed the National Information Society Agency (NIA, http://www.nia.or.kr) in October 2006. Both KADO and NIA are under MOPAS.

databases and an official government portal for civil services has been developed in the Republic of Korea. The G2C portal is a single window through which citizens and businesses can access various government services using multiple channels (see Figure 7).

Figure 7. Single-window e-government

(Source: National Computerization Agency, *e-Government in Korea* (2002), 39, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf)



In this system, the government provides various services, including issuance of various certificates, consultation, civil petition processing, electronic payment and dissemination of government information. A multi-channel approach is necessary to ensure maximum participation of citizens and businesses in e-government since different groups will have different levels of access to these channels. For example, the rural population is less likely to have access to electronic channels (e.g. the Internet, e-mail, mobile, digital TV) than the urban population.[15]

The different one-stop delivery channels that may be used to increase access to e-government services include the following:

- One-Stop Citizen Service Centres, where single-window service delivery is implemented by several agencies joining forces for customers who prefer or who can afford only face-to-face interactions. Examples of such citizen service centres may be found in Australia, Brazil, Canada, Germany, India, Kazakhstan, Portugal, South Africa and the UK.
- Telecentres – Public access points with free or subsidized access to e-government services (via postal network, libraries, schools, community centres, etc).
- Call Centres – Service delivery via the telephone provided by government call centres, often outsourced to private contractors. Examples may be found in Canada, Italy and the US.
- Web Portals – Service delivery via user-friendly government Web portals based on interoperable technologies. Examples may be found in Canada, Republic of Korea, Singapore, the UK and the US.
- M-Government – Mobile service delivery via SMS messages and specially designed m-government portals. Examples may be found in India, the Philippines and the UK.
- T-Government – Interactive terrestrial digital TV–based e-service delivery via specially designed government TV channels/portals, with both broadcast and on-demand content. Examples exist in China, Italy, Republic of Korea, the UK and the US.[16]

15 For more information about various types of multi-channel one-stop single access to government services, refer to: World Bank, *e-Government for All – Review of International Experience with Enhancing Public Access, Demand and Participation in e-Government Services: Toward a Digital Inclusion Strategy for Kazakhstan*, ISG e-Government Practice Technical Advisory Note (Draft version 30 June 2006).

16 Ibid.

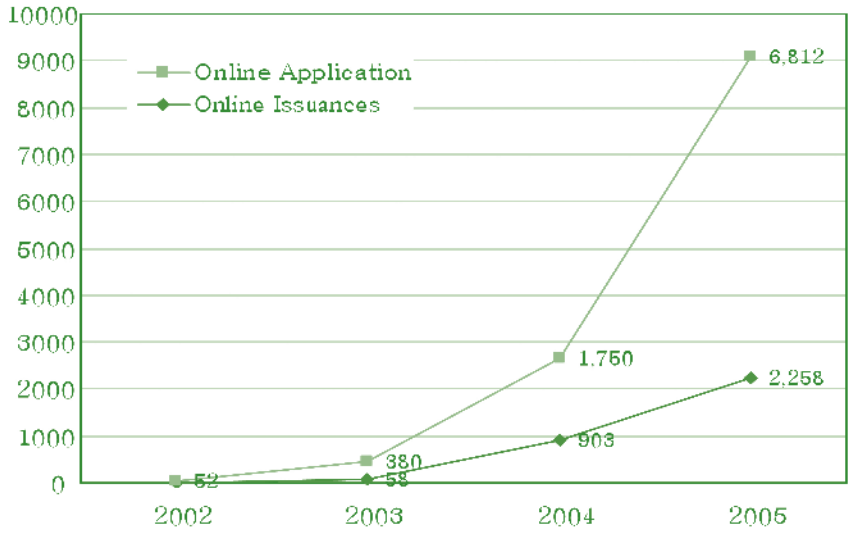
In the case of the Republic of Korea, the movement towards citizen-centric, multi-channel, single-window government started with the construction of the official Korean government homepage and Home Citizen Service Center in 1997 to systematically provide the public with administrative information and service request forms. By 1999, 20 types of citizen services had become available via the Home Citizen Service Center. In 2000, the Center was integrated with the in-house administration system so that citizens could send requests from their personal computers and then receive the requested documents at home via mail.

The G2C project was launched in 2000 to enable citizens to have easy access to information and to use one-stop online civil services regardless of time and place. By April 2002, the first and second steps of G2C were completed. ISP for enhanced online citizen services was implemented in 2003 to lay the foundation for standard G2C systems. Now Korean citizens can apply for, access and obtain certification documents through G2C online civil administration services anytime anywhere, without having to visit government offices. As of June 2006, the number of services on offer had expanded dramatically to approximately 5,000 kinds of guidelines for civil service, 630 kinds of civil applications and 30 kinds of online issuances. Furthermore, aggressive efforts to promote utilization of the service for the public and links to private portal sites such as NAVER[17] and others have resulted in remarkable increases in use of the service: from less than 1,000 hits per day in 2002 when the service was launched, to 45,000 hits per day as of June 2006 (see Figure 8).

A firm foundation for advanced e-government in the Republic of Korea was established with the building of an Internet-based citizen service system and the linking of five major national databases, including residents, land, vehicles, taxes and insurance. The new citizen service system has improved the quality of people's lives and administrative efficiency by providing services with fewer document requirements and fewer personal visits to government offices. If an average of 30 per cent of total citizen services is processed online for five years, savings of KRW 1.8 trillion (about USD 1.8 billion) is expected once the system implementation is completed.

Figure 8. Use of G2C services in the Republic of Korea

(Source: NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 22, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651)

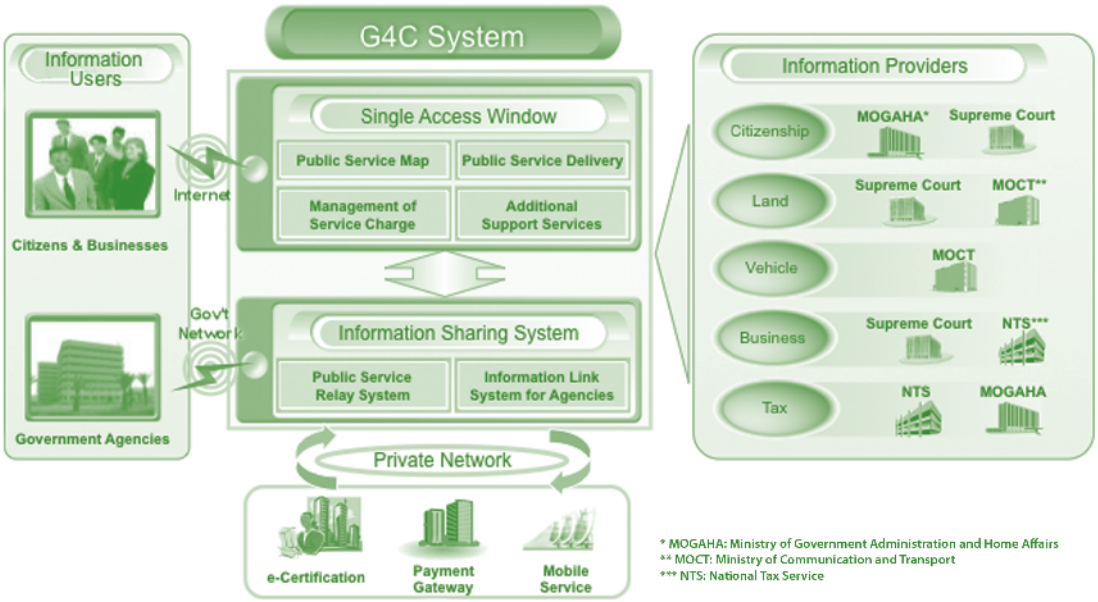


17 NAVER (http://www.naver.com), operated by NHN corporation, is a popular Internet portal site in the Republic of Korea.

Figure 9 shows how the G2C system works. The system can be divided into three parts: 1) a single contact point where citizens can access the government information and services anywhere and anytime through the Internet; 2) the system for information-sharing that is designed to enable each department to share information; and 3) the infrastructure, such as e-certification, payment gateway and mobile service.

Figure 9. e-Government single access window for Korean citizens

(Source: Soh Bong Yu, "e-Government of Korea: How we have been working with it" (KADO presentation), 19, https://www.kado.or.kr/koil/bbs/board_view.asp?config_code=362&offset=0&board_code=3246)



In Cambodia, an integrated information system for government services has also been established.

Government Administration Information System (GAIS) Project in Cambodia

The Government Administration Information System (GAIS) project was envisioned by the Royal Government of Cambodia as a flagship project to introduce ICT to Cambodian society and to accelerate administrative reform. In August 2000, the National ICT Development Authority was established and immediately tasked to implement the GAIS.

The GAIS consists of four core applications:

1. Electronic Approval System – To allow ministries to easily exchange documents and e-mails, manage documents, and post announcements.
2. Real Estate Registration – To manage and track basic data on property, ownership transfer, tax and other statistics.
3. Resident Registration – To manage and track basic data about residents, changes in the family, education and employment situations, tax owed or paid, and other statistics.
4. Vehicle Registration – To manage and track basic data on vehicles and vehicle owners, the registration process, ownership transfer, inspection information, tax owed or paid, and other statistics.

The infrastructure for the four applications is based on a local area network and wide area network for 27 ministries, State secretariats and the Phnom Penh municipality.

The project aimed to increase the efficiency of the registration processes and the document approval system by digitizing information and electronically connecting government departments. The entire system was intended to generate revenue for the Royal Government of Cambodia.

The GAIS has served to deter crimes related to vehicles and other property. Vehicle robberies have been drastically reduced because vehicles cannot be registered again. The system has also reduced the cost of registration as well as the time required to register. Prior to the deployment of the GAIS, the cost of registration was between KHR 20,000 and KHR 50,000 (USD 5 to USD 12.50). This was in addition to the official fees charged. With the GAIS, these extra fees are no longer charged.

The GAIS launched in October 2004 was intended to be a pilot. A subsequent project, the Provincial Administration Information System, is now underway to replicate this model in other cities and provinces.

Sources: Leewood Phu, *Cambodia: The road to e-governance* (Bangkok: UNDP-APDIP, 2005), http://www.apdip.net/projects/e-government/capblg/casestudies/Cambodia.pdf.

Norbert Klein, ".kh Cambodia," in *Digital Review of Asia Pacific 2005/2006* (ORBICOM, IDRC, UNDP-APDIP: 2005), http://www.digital-review.org/2005-6PDFs/2005%20C12%20kh%20Cambodia%20124-127.pdf.

Integrated tax system[18]

The consolidated online tax system in the Republic of Korea aims to facilitate the use of the Home Tax Service, which enables taxpayers to conduct all tax-related transactions without having to visit tax offices. In the past the National Tax Service (NTS) sent tax notices via mail and taxpayers personally visited the NTS to complete tax return applications. Taxpayers either visited banks in person to pay their taxes or utilized national tax payment options available via Internet banking.

The objectives of the integrated tax system are to increase tax revenue, prevent corruption, increase voluntary tax payment by taxpayers, establish advanced tax administration, and ensure fast and accurate public service.

The online tax system covers income tax, corporation tax, value-added tax, property tax and other taxes. From 1999 to 2000, the Electronic File Tax Return System was developed as a pilot project with tax agents of the Seoul office of the NTS and involving only withholding tax and value-added tax returns. The scope was expanded to include the liquor tax and special excise tax in 2001. Thirty per cent of 2.53 million withholding tax returns and 10 per cent of 2.12 million value-added tax returns were filed electronically in 2001. The scope of the electronic file tax return system was expanded further to include the securities transaction tax and stamp tax. In addition, an electronic tax payment system was developed to allow for immediate payment of taxes that are notified or reported electronically. In addition, individuals and businesses can apply for and review online certificates of business registration, tax payment, temporary suspension of business and closing of business.

By eliminating redundant data input and speeding up tax-related affairs, the integrated tax system improves operational efficiency and reduces costs. For example, savings of up to KRW 146 billion (about USD 146 million) annually are expected from the elimination of written notices that are sent via mail and the delays this mode of delivery can give rise to. Taxpayers can save up to KRW 300 billion (about USD 300 million) annually in personnel and travel costs related to visiting tax offices, while the NTS is expected to save up to KRW 120 billion (about USD 120 million) annually from paperless tax administration.

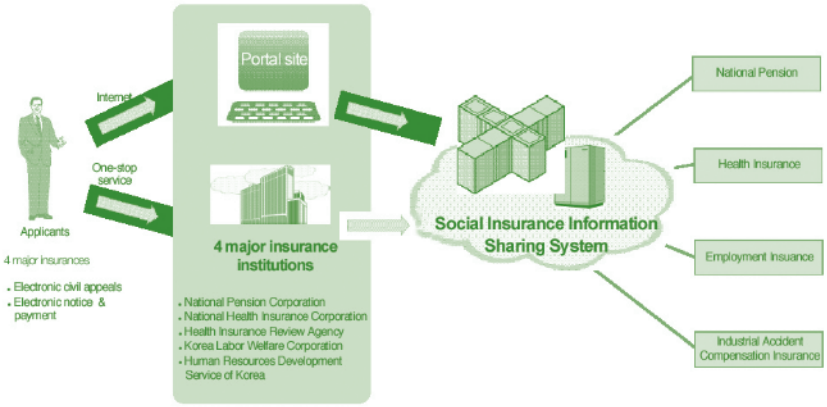
Integrated insurance system[19]

In 2001, ISP for the construction of an interconnected information system was designated as one of the main pillars of e-government. Until then, the agencies handling the four major insurance markets operated separate information systems even though they had much in common in terms of administrative processes, targets and kinds of service. With an integrated information system, information resources on the four major insurance markets, namely, the national pension, health insurance, industrial accident compensation insurance and employment insurance, are now easily shared and common operations, such as reports and changes in terms, are easily handled.

18 This section is drawn from National Computerization Agency, *e-Government in Korea* (2002), http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf.
19 Ibid.

Figure 10. The Republic of Korea's social insurance information Web portal service based on an integrated database

(Source: National Computerization Agency, *e-Government in Korea* (2002), 43, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf)



Although each agency operates its own homepage, information collected from insured persons and corporations as well as from the Office of NTS and MOGAHA is managed and shared by all agencies. More than 20 agencies (excluding businesses, hospitals and city and provincial offices) are interconnected through the system. The homepage of each agency serves as an online information centre through which enquiries, civil petitions, notices and insurance payments are processed.

With information sharing among relevant insurance agencies via the integrated system, the number of required documents, the processing time and the processing cost have all been dramatically reduced, resulting in annual savings of KRW 542.3 billion (about USD 542.3 million). The system is also expected to facilitate the identification of citizens who are not covered by the existing insurance services.

Resident registration (national identity card) applications[20]

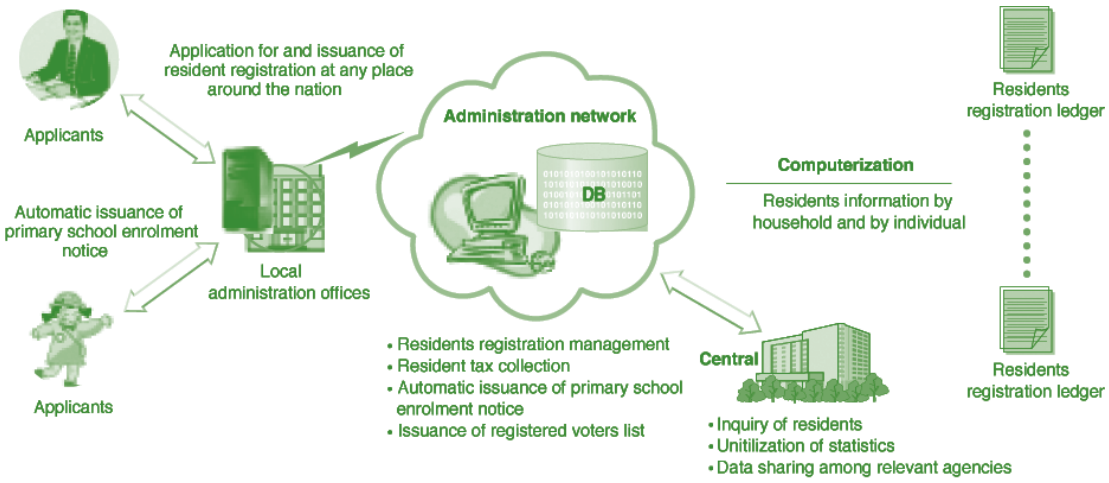
The informatization of resident registration is also a major e-government task. In the Republic of Korea, the process started two decades ago with the integration into a single record of all of the resident registration-related records of each individual and the construction of a nationwide registration database. For a period of two years (1989-1990), civil servants based in 3,678 district offices across the nation manually keyed in data from about 5.7 million ledgers. In 1998, the Resident Registration Cards Issuance Center was set up to enhance the efficiency of services by utilizing the resident registration system in networks of major government agencies. In 2001, the resident registration system was developed and distributed for common use.

20 This section is drawn from National Computerization Agency, *e-Government in Korea* (2002), http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023905.pdf.

The resident registration system is available online to all administrative agencies that need the information for various operations. The administration network system can provide the following major services: resident registration management, residence tax collection, automatic issuance of primary school enrolment notice and issuance of lists of registered voters. For citizens, the advantage of having this interconnected system is that it allows anyone living in one district to apply for a certified copy of his/her resident registration in other district offices, and changes in address are automatically applied to national pension records, health insurance records, vehicle registration records and driving licenses.

Figure 11. The Republic of Korea's resident registration system

(Source: National Computerization Agency, *e-Government in Korea* (2002), 15, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023905.pdf)



Real estate information management system[21]

Government activities in relation to real estate include developing residential land, housing plans and land utilization plans, collecting real estate taxes, and preventing speculative investments in real estate. These activities require comprehensive and efficient management of real estate information, which is made possible by informatization.

As early as 1982, land and forest land registration ledgers were stored in computer systems, resulting in a real estate database of 32 million lots across the nation. Local district offices were subsequently connected to the central network to process changes in real estate information. This process, which took six years (1985-1990), improved the accuracy and speed of public services like the issuance of certificates for registration and online circulation of ledgers. Soon thereafter, in February 1991, services were delivered online, including the issuance of registration certificates.

The Real Estate Real Name Registration System was developed following the establishment of the National Territory Information Center in 1997. Since 1998, the real estate system has been consolidated into a comprehensive administrative system for 21 large districts. As such it aligns the real estate system with the land and building management systems, as well as other relevant systems.

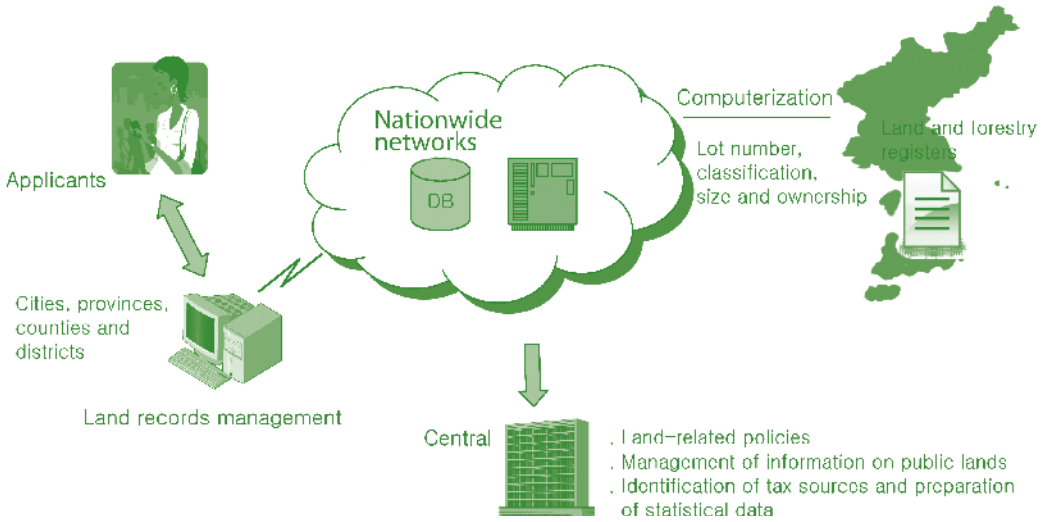
21 Ibid.

The completion of the land database and online interaction between relevant agencies has led to a reform of land-related administration services, which in turn has resulted in the following:

- Streamlining of a 10-phase process to three phases
- Prevention of a 15 per cent increase in human resources for land-related administration services
- Improvement of the quality of services
- Accessibility of land and forestland ledgers to citizens who can review them through computer terminals in their homes
- Reduction of the processing time per request from 30 to five minutes
- Greater transparency in land-related and real estate transactions

Figure 12. Concept map for the Republic of Korea's real estate management system

(Source: National Computerization Agency, *e-Government in Korea* (2002), 17, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023905.pdf)



Vehicle administration[22]

When the number of cars in the Republic of Korea surpassed 10 million, it was felt that an information system to effectively handle the explosive increase in vehicle-related administrative requests was needed.

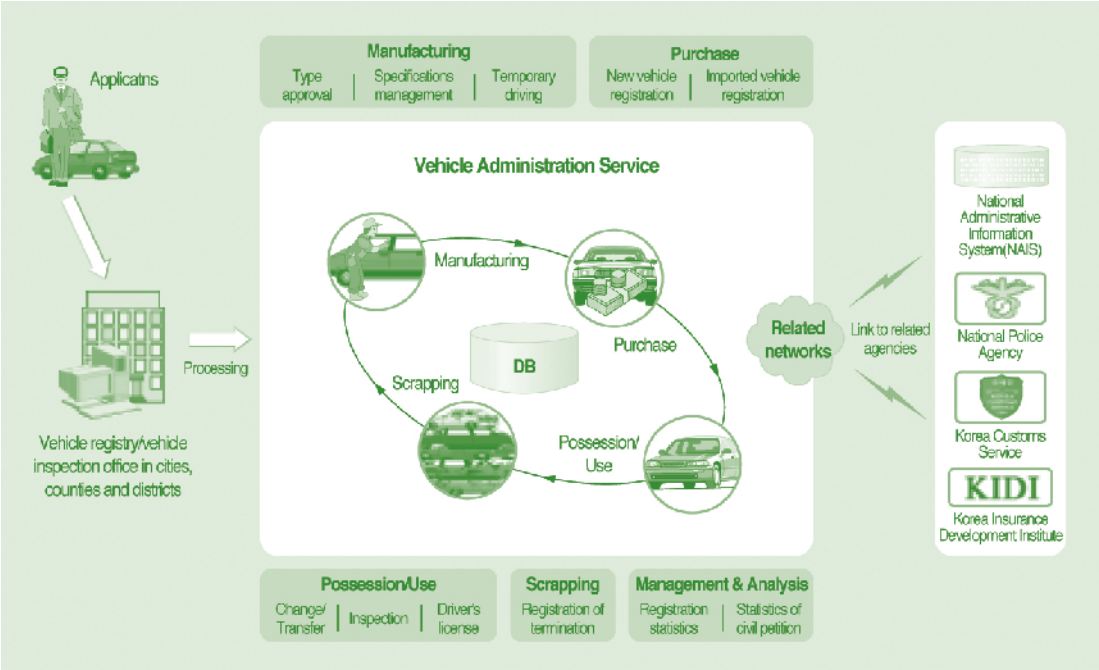
However, it took a decade for the current integrated vehicle administration system to evolve. The focus in 1991 was on vehicle registration and inspection, which did not do much to improve the efficiency of general automotive services because of the lack of attention given to support services such as vehicle specifications, temporary driving permission, and drivers' license management and delivery. In 1998, a much more comprehensive vehicle administration system was developed; it included the whole range of vehicle administration tasks, from registration to inspection to check-up and operation. A system covering two-wheeled vehicles and construction machinery was added in 1999, and this was followed two years later by a common platform allowing various agencies to collect and share vehicle-related information.

The integrated system has resulted in some KRW 8.2 billion (about USD 8.2 million) in savings. It also saves both government and citizens a lot of time, with the registration of one vehicle now taking only 20 minutes instead of an hour.

22 Ibid.

Figure 13. Concept for the Republic of Korea's vehicle registration service

(Source: National Computerization Agency, *e-Government in Korea* (2002), 19, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023905.pdf)



Questions To Think About

1. Of the G2C services described in this section, which do you think would be a priority in your country from the point of view of citizens? Why?
2. How can an integrated tax system help increase the tax revenue? What is needed for such a system to be set up in your country?
3. In this section we discussed the five basic citizen services in G2C. Can you identify any other citizen service that can form part of a G2C system?

Test Yourself

Explain the work flow for each of the following systems: a) integrated tax system; b) integrated insurance system; c) residents registration; d) vehicle registration; and e) real estate management system.

3.2 Government to Business (G2B): Innovating business services

Integrated e-procurement system

The Republic of Korea joined the World Trade Organization Government Procurement Agreement in 1994. This threw a spotlight on various problems associated with the manual procurement system, such as inefficiency caused by redundant manual processing methods and corruption due to intensive personal contacts.[23] Thus the decision was made to establish an advanced digital procurement system that would ensure timely delivery, quality products and reasonable prices based on accurate procurement information, and build a transparent and efficient procurement environment for all participants.[24]

Figure 14. Single-window government procurement system

(Source: National Computerization Agency, *e-Government in Korea* (2002), 41, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf)

The digital system that has been adopted is called the e-Procurement System of the Public Procurement Service of Korea (KONEPS). This is an online system that enables quick and convenient processing of all public procurement-related administrative procedures, including bidding, contracts, payment and product delivery. Procurement information, including receipt of purchase requests and public announcement of biddings, award of contracts and contract status, is provided online, which ensures fairness and transparency for all transactions. This electronic procurement system was the first online bidding system in the Republic of Korea. It is being used by some 770 institutions and agencies, 35,000 public organizations and 160,000 companies.[25]

Compare the Republic of Korea's e-procurement system with that of the State of Andhra Pradesh in India.

23 "eGovernment: Saving time and spending less with e-services," *Korea Herald*, 17 March 2007, http://www.britain.or.kr/information/print.php?lang=e&umode=graphic&dno=13525.
24 National Computerization Agency, *e-Government in Korea* (2002), http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf.
25 Ibid.

e-Procurement in Andhra Pradesh, India

With the enactment of the IT Act of 2000 to provide legal recognition to electronic transactions, the Government of Andhra Pradesh (GoAP) saw the importance of e-procurement in meeting the goals of e-governance and achieving good governance. In 2002, the GoAP ventured into partnerships with private firms in India to develop e-procurement processes and applications. The partnership aimed to:

- Set up a single window for procurements
- Save time and money on procurement transactions
- Standardize the government's procurement processes
- Allow equal opportunities to businesses
- Promote transparency
- Reduce opportunities for corruption

Since the pilot implementation in 2003, the e-procurement.gov.in Web portal has become the e-procurement platform for all GoAP departments, including local bodies and municipal corporations. The service is also available to other State governments.

The e-procurement portal connects buyers and suppliers through electronic exchange of tenders, catalogues, contracts, purchase orders and invoices. The portal also has a tender management software to assist buyers in the bidding process. Suppliers can download tender documents and track the status of bids.

In January 2003, the Governor of Andhra Pradesh issued an Order stating that: "Any tender for an engineering work or procurement of goods and services of a value of INR 10,000,000 (about USD 236,500) and above by the Commissionerate of Tenders shall be taken up only through the e-Procurement portal."

Procurements transacted include medical supplies, vehicles and turnkey contracts. From an initial eight departments that utilized the system and performed 564 transactions in 2003, the system has grown to include 77 agencies with 9,981 transactions in 2006. The tender cycle time has been significantly reduced from 90-135 days to 35-42 days.

Challenges in establishing this e-procurement system include: designing a sustainable business model; promoting inter-departmental cooperation; getting stakeholder buy-in to adopt and use the platform; and ensuring system security.

Sources: Information Technology and Communications Department, "eprocurement.gov.in," Government of Andhra Pradesh, India, http://www.eprocurement.gov.in.

Information Technology and Communications Department, "Government Order: Validation and enablement of procurement process through e-procurement marketplace by the participating departments" (GO.MS.2.2003), http://www.aponline.gov.in/Quick%20Links/Departments/Information%20Technology%20and%20Communications/Govt-Gos-Acts/2003/GO.Ms.2.2003.html.

K. Bikshapathi, "Case Study on A.P. eProcurement" (Presentation, 2007), http://himachaldit.nic.in/Casestudy-APeProcurement.pdf.

K. Bikshapathi, P. RamaRaju and Subhash Bhatnagar, *E-Procurement in Government of Andhra Pradesh, India* (Washington, D.C.: The World Bank, 2006), http://go.worldbank.org/XJS8XWB030.

Customs applications system

Prior to the establishment of an e-customs system in the Republic of Korea, importers and exporters needed to appear in customs houses and financial institutions to clear their goods, pay customs duty and apply for tax refunds. Clearance, surveillance and control over airports and sea ports were not systematic and although good enough to satisfy a customer's basic needs, they caused a lot of inconvenience.

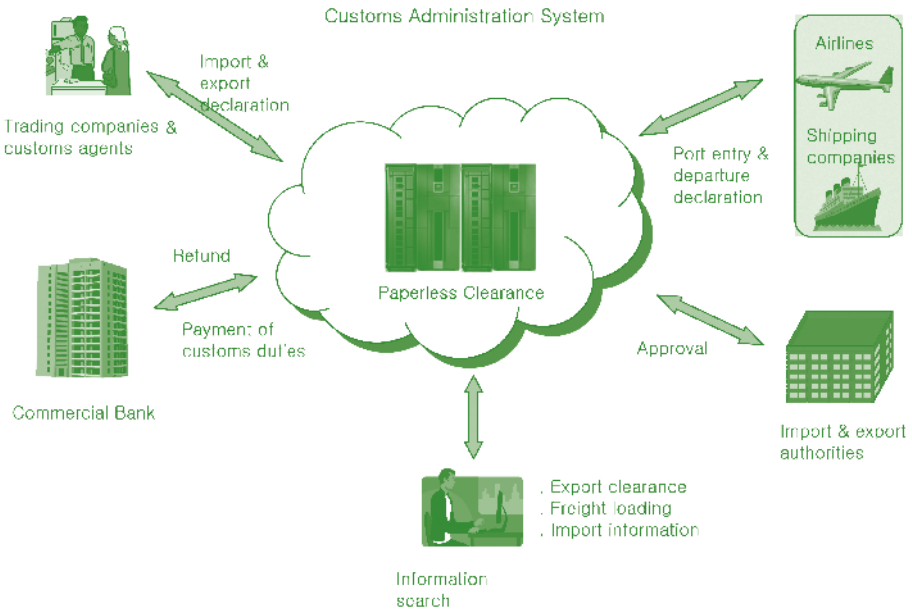
The objectives of building an e-customs system were to: a) establish information systems that streamline customs administration; b) halt smuggling; c) reduce logistics costs in the import and export industry; and d) improve the quality of customs services offered.

Accordingly, the e-customs system of the Republic of Korea is a one-stop single window for international trade transactions. Customs clearance procedures such as import/export reports, entry into port and cargo management data are all computerized, which contributes greatly to enhancing the competitiveness of domestic import/export companies. Through the e-customs system, export customs clearance can currently be processed within two minutes and import customs clearance within 1.5 hours. This is one of the fastest customs clearance systems among 169 member states of the World Customs Organization. Complicated import clearances that used to take two days are now completed in only 2.5 hours, which is four hours faster than the UNCTAD recommendation.[26]

The system has resulted in annual savings of about KRW 2.5 trillion (about USD 2.5 billion). Additionally, the system is credited with an overall industry cost reduction of an estimated KRW 3,878 billion annually due to direct effects, such as time/cost reduction of KRW 709 billion, related industry effects such as productivity enhancement of related industry and efficiency of using facilities of KRW 2,370 billion, and a ripple effect of KRW 798 billion on other industry sectors.[27]

Figure 15. e-Customs system of the Republic of Korea

(Source: National Computerization Agency, *e-Government in Korea* (2002), 29, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023904.pdf)



26 *Korea Herald,* op. cit.
27 Ibid.

Another example of customs reform using ICT can be found in the Philippines.

Philippine Customs Reform

In 1995, the Philippine Bureau of Customs (BOC), in collaboration with the World Bank and UNCTAD, implemented an online system to process clearance of imports, payment of duty and delivery of release orders for its customs transactions.

The Bureau selected ASYCUDA,[28] a widely utilized off-the-shelf software developed by UNCTAD. The nearly paperless system enables payment of duties and taxes directly to an authorized Agent Bank. The duties and taxes paid are matched against the amount payable set in BOC's database, and a release order is issued when both amounts match. This speeds up the customs clearance process and meets BOC's overall objective of facilitating trade.

The system also provides risk assessment of shipments. Images, barcodes and online references to external databases are utilized to classify all consumption and warehousing entities as either low-, medium- or high-risk shipments, which in turn determine the level of document checks and physical examinations necessary.

The final release of in-dock shipments is handled by the On-Line Release System, which utilizes the public telephone system for coordinating transactions to the inland Container Freight station located some kilometres from the ports.

The system has since been upgraded as part of the ASYCUDAWorld (e-Customs) Project, which features core and support system enhancements, including hardware and network infrastructure. Specifically, ASYCUDAWorld offers the following enhancements:

- Online submission of declarations
- Automatic advice on declaration status
- Use of value added service partners
- Online submission of manifests by airlines and shipping lines, including deconsolidators
- Automated process for other types of import transactions, such as informal (including passenger baggage system), warehousing and trans-shipment entries
- Automated process for liquidation of raw materials
- Centralized management of bonds transactions
- Links with relevant government agencies
- Online resource access through the BOC website on issuances, processes, policies, guidelines and other related information »

28 Automated System for Customs Data.

» In October 2004, the pilot testing of a new clearance system utilizing the GXS RosettaNet eCustoms Solution was successfully completed by the BOC. The new automated system for shipping documentation enables high-tech industry manufacturers to securely send electronic customs declarations. The new system aims to boost the productivity of the Philippine electronic industry by enabling more secure and automated transactions with their foreign suppliers.

Sources: Asia Pacific Council for Trade Facilitation and Electronic Business, "Philippines Progress Report," in *2006 AFACT Year Book* (Taipei: Bureau of Standards, Metrology and Inspection, Ministry of Economic Affairs, 2006), 113-134, http://www.afact.org/group/application/afact/2006AFACT/pdf/(4)%20Country%20Reports/7-p113_p134-2006%20Report-Philippines.pdf.

Businesswire, "Philippines Bureau of Customs Deploys GXS' RosettaNet eCustoms Solution; Faster Clearance and Reduced Cost Benefits Targeted at Philippines Semiconductor and Electronics Industries" (2005), http://findarticles.com/p/articles/mi_m0EIN/is_2005_August_25/ai_n14930696.

Sub-Committee on Customs Procedures, "APEC Best Practices Paper on Innovative Techniques for IPR Border Enforcement" (APEC Meeting, 23-25 June 2007, Cairns, Australia), http://aimp.apec.org/Documents/2007/SCCP/SCCP2/07_sccp2_016.doc.

Subhash Bhatnagar, *Philippine Customs Reform* (The World Bank: 2001), http://go.worldbank.org/J8J2YV6KG0.

Questions To Think About

What do you think are the issues and challenges in adopting and maintaining an e-customs system? How can these be addressed?

e-Commerce applications[29]

e-Commerce primarily refers to buying, selling, marketing and servicing of products or services over the Internet and other computer networks. But e-commerce has many other aspects. The role of government in e-commerce is to enable the business community to obtain the most valuable information and apply it in a timely manner to the production and sale of goods and services. e-Commerce builds on the advantages and structures of traditional commerce by adding the flexibilities offered by electronic networks.

29 This section is drawn from *e-Korea Vision 2006: The Third Master Plan for Informatization Promotion* (2002-2006) (Seoul: Ministry of Information and Communication, 2002), http://www.ipc.go.kr/ipceng/policy/vision_2006.jsp.

Box 2. Addressing legal issues relating to e-commerce

The adoption of legislation on e-commerce is a necessary step to increase confidence in the electronic media. A number of legal issues require attention. For instance, the Organisation for Economic Co-operation and Development (OECD) has identified the following: taxation, privacy, consumer-related issues, cryptography and authentication/ certification, access to and use of the information infrastructure, and society-wide impacts.

Issues related to the taxation of goods and services traversing electronic networks need to be resolved without delay. The issue of data security is also crucial in e-commerce whether with respect to buying airline tickets online, using debit and credit cards through the Internet, or online trade of mutual funds, insurance and depository services.

The United Nations Commission on International Trade Law (UNCITRAL), the core legal body of the United Nations system in the field of international trade law, has prepared uniform legislation on e-commerce. In particular, UNCITRAL has prepared the UNCITRAL Model Law on Electronic Commerce, 1996, the UNCITRAL Model Law on Electronic Signatures, 2001 and the United Nations Convention on the Use of Electronic Communications in International Contracts, 2005.

These texts, which have already been adopted in a number of jurisdictions and are commonly considered as standards, aim at improving predictability in cross-border transactions and increasing confidence in the electronic media. The texts are built around principles such as non-discrimination of electronic communications, functional equivalence between paper and electronic form and technological neutrality. Moreover, other UNCITRAL texts in various fields of international trade law, such as arbitration, procurement and transport, also contain provisions dealing with the use of electronic media in those fields.

One of the key features of e-commerce is the establishment of business-to-business (B2B) transactions to promote small and medium enterprises (SMEs). Government needs to build the basic infrastructure that is necessary to promote e-commerce for small businesses, such as wireless telecommunication networks utilizing ultra high frequency, and strengthen existing infrastructure such as mobile telecommunication networks, satellites and broadcasting networks. In B2B e-commerce, government needs to build and provide services in the area of e-payment, logistics, security, global e-trade networks and legal issues.

Advancing B2B e-commerce: B2B e-commerce can enhance productivity and transparency through the informatization of all business activities, and promote information sharing and cooperation among firms located in a single value chain to stimulate c-commerce (collaborative commerce). c-Commerce is a business model where a company integrates its systems with those of its suppliers and partners across the Internet. It is supported by a growing number of B2B applications that automate key business processes in a supply chain extending beyond the enterprise boundaries, from raw materials to finished products.

The government can develop and deploy systems supporting c-commerce and the optimal algorithms for efficient inter-firm cooperation. The government can promote pilot projects for

c-commerce with prospective SMEs as targets for these projects. Current corporate culture tends to be closed and non-transparent. Hence the need for the government to promote information sharing. To ensure smooth B2B e-commerce and information sharing, it is necessary to develop efficient interfaces and promote the standardization of data and protocols that will facilitate transaction authentication and guarantee information security.

Expanding B2B networks: The government should promote e-businesses in the manufacturing and service industries to enhance the competitiveness of these industries. In the Republic of Korea the government targeted a 30 per cent ratio of e-commerce to total transactions in six core industries (electronics, automotive, ship building, steel, machinery and textile industries), and 25 per cent in the remaining industries. The government supported the construction of B2B e-commerce infrastructure, such as standardization and e-cataloguing of each industry. By 2005, more than 50 industries had constructed their B2B networks.

Improving logistics and payments systems for promoting B2B e-commerce: A joint logistic system that links to relevant systems (e.g. the financial information system) is a key component of promoting B2B e-commerce. Such a logistics system can be built based on an intelligent transportation system and geographic information system, and through linkages with wireless telecommunication networks.

Moreover, laws and regulations related to e-payment need to be improved to ensure a reliable and safe environment for e-commerce. It is necessary to expand the infrastructure for e-payments, and introduce personal identification systems and a security management system to ensure the safety of e-money.

Establishing an infrastructure for international e-trade: Information about foreign e-marketplaces is useful for promoting international e-trade. Such information should cover document, catalogue and commodity standards. In addition, governments need to provide specialized services that can help resolve possible disputes arising from international trade.

e-Trade provides an environment for paperless international trade through the establishment of an integrated system of international trade automation suitable for the Internet. In the Republic of Korea electronic data interchange (EDI) systems are distributed by the government to all exporters, and possible obstacles to international trade automation are removed. A global e-trade network project to handle all processes associated with international trade, including intermediation, contracts, payment and logistics, is planned. By linking the network to the international trade automation systems of other Asian and European countries, the Korean government hopes to build an e-trade environment for all international traders.

Promoting informatization of SMEs: The Korean government has identified as one of its priorities connecting all companies in the Republic of Korea to the Internet and expanding the bases of e-business throughout the country. To this end, the government helps SMEs in the Republic of Korea acquire Internet access and adopt IT through the integrated services offered by application service providers. A comprehensive e-business support system is being planned, as well as the provision of services in concentrated industrial complexes.

An industrial information distribution system that will help the Republic of Korea's 30,000 SMEs to enhance their competitiveness and reduce the cost of obtaining information is being constructed. Databases and integrated search systems of industrial information are to be developed in major industries such as machinery and electronics. SMEs are also being encouraged to organize associations for community-type B2B e-commerce on a small scale.

e-Commerce in the Republic of Korea

The volume of e-commerce in the Republic of Korea reached KRW 413.584 trillion in 2006, representing a 15.4 per cent increase from 2005. The proportion of each transaction type did not change much, with the proportion of B2B having decreased and that of B2G having increased to some extent.

The 2006 Status Survey on Domestic e-Business carried out by the Korea Institute for Electronic Commerce on 4,000 companies in the Republic of Korea shows that about 36.7 per cent of companies are currently performing electronic transactions (a broader definition of electronic commerce) or one or more processes for commercial transaction through computers or networks.

According to data from the National Statistical Office, B2B transaction volume in 2006 accounted for 88.5 per cent of total transactions. Of the B2B transactions, buyer-led transactions accounted for 71.9 per cent and seller-led transactions for 23.5 per cent, showing that most markets are still buyer-led. The broker-led e-commerce transactions volume was 4.5 per cent of the total transactions, a slight increase from the previous year.

In the B2G market in 2006, the construction contracts, which took a large portion between 2002 and 2005, decreased to a smaller portion relative to the purchase of goods and services for the first time in five years. The B2G market involving government bodies such as central administrative organizations, local government organizations and offices of education accounted for KRW 34.436 trillion.

The number of online shopping malls in 2006 increased 4.0 per cent from 2005 to 4,531. Of this total, 4,289 or 94.7 per cent are specialized malls and only 5.3 per cent are general malls. However, in terms of transaction volume, 71.1 per cent or KRW 9.5707 trillion worth of transactions were done by general malls, more than in 2005, and 28.9 per cent were carried out by specialized malls. When analysed by type of operation, online malls accounted for 48.7 per cent (2,208) while malls operating both online and offline accounted for 51.3 per cent (2,323).

Source: Abridged from *2007 Informatization White Paper: Republic of Korea* (Seoul: National Information Society Agency, 2007), http://www.nia.or.kr/open_content/board/fileDownload.jsp?tn=PU_0000100&id=53922&seq=1&fl=7.

e-Commerce in Thailand is described below.

e-Commerce in Thailand

e-Commerce is one of the main goals stated in Thailand's Information Technology Policy Framework 2001-2010 (IT2010). The aim is to strengthen the competitiveness of Thai entrepreneurs, particularly SMEs.

IT2010 outlines eight strategies for enhancing e-commerce in Thailand:

- Pursue a proactive foreign strategy, including announcing e-commerce as a key national trade strategy, integrated with the Ninth and Tenth National Economic and Social Development Plans

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- Create awareness of e-commerce, particularly among SME entrepreneurs
- Provide a favourable legal environment for e-commerce
- Promote and support safety and security systems
- Focus on database and data management strategies, including measures for establishing a database and a data network to facilitate planning and services for businesses, industries and consumers
- Support SMEs in the use of e-commerce applications and enhance their competitiveness in the global economy
- Develop human resources for the education sector and for skill development in the current market workforce
- Provide adequate and affordable infrastructure and its components to enable the widespread use of e-commerce applications by both businesses and consumers, including the establishment of standards for key products, goods and services in the country

The Government of Thailand has implemented a number of initiatives to spur the growth of e-commerce. One of these is the Commercial Registration Act that requires e-commerce business operators to obtain a commercial registration. The Ministry of Commerce is using a trust mark (electronic stamp of approval) to set standards for e-commerce websites and build customer confidence. An e-commerce complaint centre was set up in 2006. Moreover, several government agencies as well as private companies, including banks and manufacturers, are implementing online transactions.

In 2004, over 2,500 websites operated by about 1,860 e-commerce entrepreneurs in Thailand were registered with the Ministry of Commerce. Electronic B2B transactions comprise the bulk of transactions in the e-commerce industry in Thailand. One of the main online auction/procurement service providers is Pantavanij (https://www.pantavanij.com). Pantavanij's transactions in 2005 reached THB 47.9 billion, with THB 35.2 billion in online purchases and THB 12.7 billion in online auctions. Online transactions in 2005 reached about THB 100 billion, up from THB 63 billion in 2003.

To further strengthen Thailand's e-commerce industry, e-commerce needs to be promoted among SMEs and citizens need to be encouraged to participate in B2C transactions.

Sources: The Economist Intelligence Unit, "Thailand: Overview of e-commerce," in *The Economist* (11 January 2007), http://globaltechforum.eiu.com/index.asp?layout=rich_story&doc_id=9936&title=Thailand%3A+Overview+of+e-commerce&channelid=4&categoryid=30.

National Electronics and Computer Technology Center, *Thailand ICT Indicators 2005* (Bangkok: National Electronics and Computer Technology Center, National Science and Technology Development Agency, Ministry of Science and Technology, 2005), http://www.nectec.or.th/2008/pdf/ict_indicators2005.pdf.

National Information Technology Committee Secretariat, *Information Technology Policy Framework 2001-2010: Thailand Vision Towards a Knowledge-Based Economy* (Bangkok: National Electronics and Computer Technology Center, National Science and Technology Development Agency, Ministry of Science and Technology, 2003), http://www.etcommission.go.th/documents/it2010_publish_version_en.pdf.

Somnuk Keretho and Paisan Limstit, *e-Commerce: The Way of Business in Thailand* (Bangkok: National Electronics and Computer Technology Center, 2002), http://www.ecommerce.or.th/APEC-Workshop2002/ppt/pdf/ec_way_business_in_Thailand.pdf.

Thaweesak Koanantakool and Kalaya Udomvitid, ".th Thailand" in *Digital Review of Asia Pacific 2007/2008* (New Delhi: Sage, IDRC, Orbicom: 2007), http://www.idrc.ca/en/ev-127181-201-1-DO_TOPIC.html.

Something To Do

1. Describe the SME sector in your country and explain how e-commerce can help this sector.
2. What are the killer e-commerce applications in your country? Describe one or two of these, including how they came about and their impact on your country's economy.

Test Yourself

1. List the common G2B services.
2. Why is it so important to build an e-procurement system?
3. There are many components and subsystems that are needed to establish the following systems: e-procurement, e-customs and e-commerce. Identify these components.
4. Briefly explain the meaning of B2B, B2G, B2C and C2C and list the types of business transactions that characterize each.
5. What type of products and services can be provided through e-commerce?

3.3 Government to Government (G2G): Innovating the way government works

Integrated finance system[30]

In the early 1980s, as a result of the increasing liberalization and globalization of financial markets, competition between local financial institutions intensified and profitability deteriorated. To address the problem and increase competitiveness in international markets, the need for a financial information network that would re-engineer transaction procedures and provide better quality of service to customers was raised.

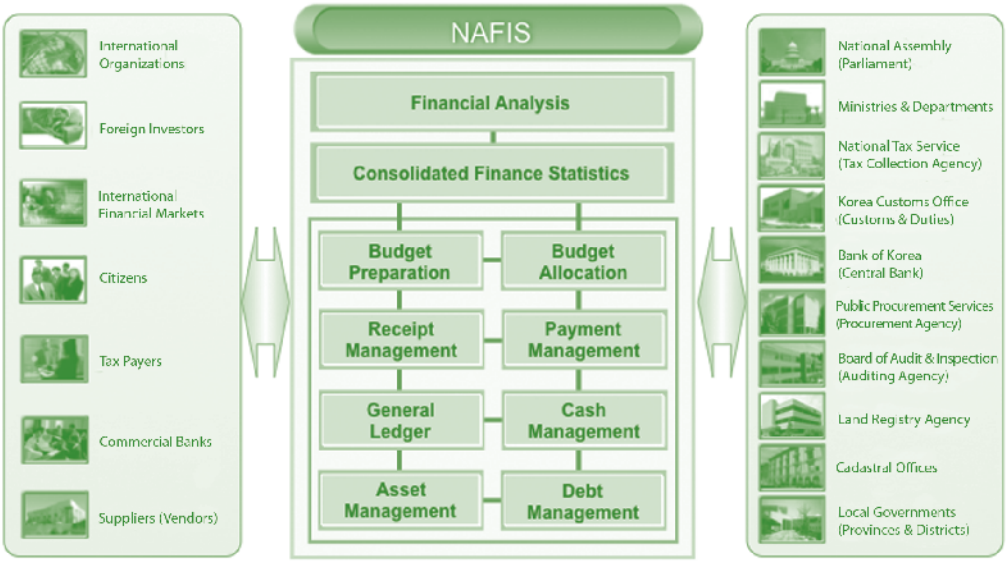
From the mid-1970s to 1985 local banks in the Republic of Korea introduced computer systems to business units and established networks interconnecting headquarters and branches. In the early 1980s, as part of the National Basic Information System project, the inter-bank financial information system was deployed, enabling customers to enjoy inter-bank financial transactions. The inter-bank financial information system was upgraded in 1992-1996 and non-banking financial institutions, such as securities firms, insurance firms and investment banks, were also interconnected. Firm banking and home banking services were established in 1994. Beginning 1997, the financial information system of non-banking financial institutions was also established, laying the foundation for linking all financial institutions, including banks, securities firms, insurance companies and investment banks.

30 This section is drawn from National Computerization Agency, *e-Government in Korea* (2002), http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023905.pdf.

In the government financial management sector it was necessary to interconnect all financial information systems operating independently in various government agencies. This integrated financial system is called NAFIS (Figure 16).

Figure 16. Engine of Korean government financial management reform

(Source: Soh Bong Yu, "e-Government of Korea: How we have been working with it" (KADO presentation), 16, https://www.kado.or.kr/koil/bbs/board_view.asp?config_code=362&offset=0&board_code=3246)



As Figure 16 shows, NAFIS consists of 10 modules:

The Budget Preparation and Budget Allocation Modules cover all budgeting processes of the government.

The Receipt and Payment Management Modules cover tax and non-tax revenue collection and public expenditure.

The General Ledger Module covers the recording of all accounting transactions, year-end closing and fiscal reporting of each government entity.

The Cash Management Module covers cash forecasting, cash allocation and idle cash operation by the central bank.

The Asset Management and Debt Management Modules cover national property management such as land, buildings, airplanes and ships, and country risk management, respectively.

The Consolidated Finance Statistics Module includes the generation of fiscal reports based on consolidated financial information from all government organizations.

The Financial Analysis Module covers macroeconomic forecasting and simulation, financial index analysis and performance measurement.

NAFIS interfaces with other internal and external systems, enabling real-time management of national fiscal activities and interconnecting 23 finance-related systems that are operating independently in various government agencies.

Local and special accounting data and statements are consolidated in the national financial information system. There are 40 financial information systems running in the Republic of Korea. NAFIS covers overall government accounting and financial management supporting policy decisions.

The financial information network removes the constraints of time and place, enabling financial transactions 24 hours a day, 7 days a week and 365 days a year, from the living room to the workplace. It provides the momentum for local financial markets to grow by creating a shared financial information system platform. This network is expected to help strengthen the international competitiveness of the Republic of Korea's financial industry as financial institutions will be able to benchmark to the best practices of advanced countries through this infrastructure.

Consolidated financial information system for Central/Local Governments: National finance is integrated and managed under the Digital Budget and Accounting System, which was adopted as a national agenda, separate from the e-government roadmap projects. In 2004, local finance informatization was carried out in four stages (see Table 4).

Table 4. Four core tasks for the local government financial system

Stage	Major Achievements
Accrual/Double-entry Accounting	• Design Accounting Subjects • Unified Settlements and Financial Reports • e-Joumal for Standardized Processes • Strengthened Auditing and Self-supporting Accountants
Introduction of Project Budget System	• Establishing Project Budgets • Reorganization of Budget Item Structure • Project Budget System Perfomance Management • Cost Management by Function
Strengthening of Financial Management	• Improved Fund Management and Efficient Allocations • Electronic Bill Presentment and Payment • Improved Debt Management • Electronic Funds Transfer
Advancement of Informatization	• Design Standardized Local Finance System • Build Local Financial Infrastructure • Connecting/Unifying System

Source: NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 14, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651.

All areas of local finance information systems, including revenue management, assets and liabilities, are to be developed and distributed to local governments. The target is to improve the efficiency of local finance management, prevent duplication of investments and enable information-sharing among local governments. The latter would lead to overall cost-savings, especially in labour and management.

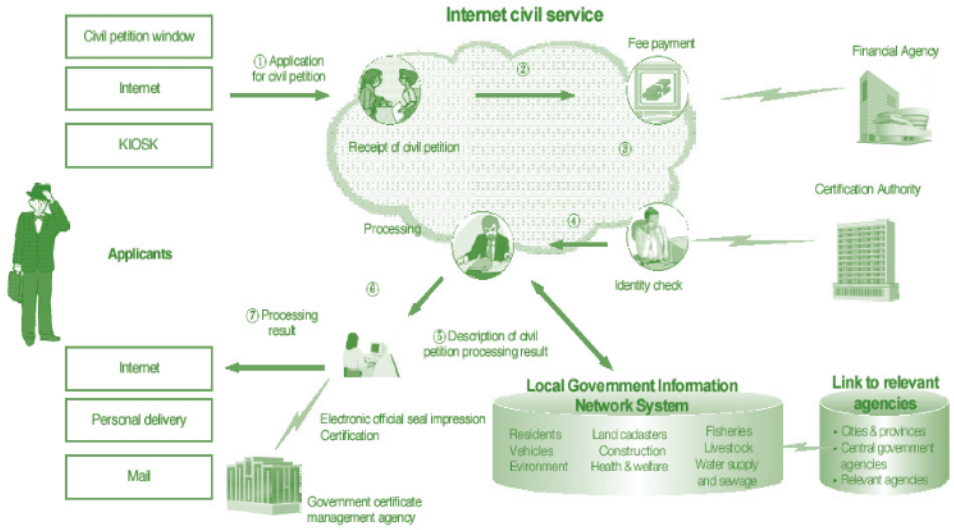
Local e-government information system[31]

On the one hand, there is a need to improve efficiency, which has been declining due to the manual processing of administration duties, to simplify the paper-based civil petition process and to reform civil petition services via a one-stop service. On the other hand, redundant investments in informatization are made by different functional or regional units, resulting in low returns on investment. Thus, administrative information systems need to be transferred to regional units to optimize operational efficiency and customer satisfaction.

Digital local government enables real-time information-sharing through vertical and horizontal linkages between central and local administration organizations. More specifically, the informatization project for local governments in the Republic of Korea was introduced to standardize information processing and task performance. The project, which was implemented over three years starting in 2003, has helped reduce the duplication of investments as well as the digital gap among the different regions in the Republic of Korea. Efficiency has been enhanced and consumer service improved with the introduction of the electronic processing infrastructure for administration and citizen petition tasks.

Figure 17. Concept for digital local government system in the Republic of Korea

(Source: National Computerization Agency, *e-Government in Korea* (2002), 47, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf)



The digitization of local government in the Republic of Korea began in 1997 with the preparation of the Basic Plan for the Comprehensive Administrative Information System for Cities, Counties and Districts. Following the successful piloting of aspects of the system in four cities in 2000, it was rolled out nationwide and now covers 232 cities, counties and districts. Civil petition applications, registration and processing are now available around the country, and kiosks are being installed for citizens where they can access 37 different certificate issuance services.

For citizens, the benefits of the local e-government system include a significant reduction in the volume of paperwork and the number of visits to relevant government agencies. This in turn reflects the shift in orientation of government services from being business-oriented to being customer-oriented.

31 Ibid.

From the point of government, digitization and integration mean better coordination between central and local governments, improved administrative systems and increased efficiency. For example, in the Republic of Korea automating 904 work processes in 18 common administrative areas has enhanced efficiency in work procedures, while the burden on civil servants has been reduced by preventing the duplication of functions. The central and local governments have a connected reporting system, resulting in increased efficiency and accuracy.

To connect the 18 central government ministries and local governments, an information delivery channel has been established after the standardization of 1,237 items. A total of 751 kinds of civil services have been digitized and 48 kinds of services connected with the G2C portal, and these can now be accessed via the Internet.

To enhance town/county/district administration, 21 administrative work processes were digitized under the informatization project for town/county/district administrations between 1998 and 2003. Also in 2003 town, county and district local governments assumed overall responsibility for resident registration management processes previously undertaken by village units.

During the BPR and ISP for the digitization project in 2005, goals and objectives for local e-government at the town/county/district level were refined, and 20 priority projects were identified. An estimated 2,897 documents were digitized and shared, enabling one-stop service and reducing the need to visit multiple agencies. In addition, MOGAHA (renamed MOPAS in 2008) has been tasked with developing information systems by stages and deploying the systems to 234 local governments by 2012.

As the description of the Republic of Korea's efforts above suggests, developing and implementing local e-government is a complex process. Various issues need to be addressed throughout the project lifecycle. The issues in the Philippine case are described below.

The e-LGU Project in the Philippines

In response to the passing of the e-Commerce Act that directed all government agencies, including local government units (LGUs), to use electronic means in government transactions, the National Computer Center (NCC) of the Philippines implemented the Jumpstarting Electronic Governance in Local Government Units (e-LGU) Project between 2002 and 2005. The aim of the project was to assist all LGUs in their computerization efforts to enable better and faster delivery of government services. The project included website development for all LGUs and provision of e-government applications, namely, the Real Property Tax System (eRPTS), Business Permit and Licensing System (eBPLS), and Treasury Operations and Management System (eTOMS).

The project succeeded in getting 99.5 per cent of the LGUs to develop a website. However, some of these websites have not been updated since they were set up in 2002, and many of the websites only provide standard information about the LGU (e.g. history, topography, composition of the government) and do not offer any e-government services.

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» Moreover, none of the LGUs had fully deployed the eRPTS by the time the e-LGU Project ended in 2005. The plan was for the winning bidder to develop the eRPTS and install it in one pilot area while NCC would take charge of installing the system in the other LGUs. However, aside from various problems in developing the system, the additional expenses that LGUs needed to fork out to customize the software, build the database and provide staff training, resulted in deployment delays. In essence, while each LGU received the eRPTS system for free, the cost of having a fully-functional system was not without cost.

The implementation of the e-LGU project was centralized and top-down. This is evident in the following: a) hosting and control over the content of their websites did not reside in the LGUs; b) the choice of ICT applications for LGUs was limited to three revenue generation systems; and c) the systems developed were the responsibility of one contracted developer instead of a community of developers.

It is likely that the outcome of the project would have been different had the implementation process been more participatory, with the LGUs being given more control over their content and more resources being focused on developing an appreciation for the benefits of using the Internet. Moreover, the LGUs and other organizations could have been involved in designing and developing the relevant e-government applications, while the national body developed a common standard for the database architecture to allow information sharing among LGUs.

Source: Adapted from Erwin A. Alampay, *Philippines: Incorporating participation in the Philippines e-LGU's Project* (Bangkok: UNDP-APDIP, 2005), http://www.apdip.net/projects/e-government/capblg/casestudies/Philippines-Alampay.pdf.

Something To Do

1. Identify a priority area for the establishment of an integrated government information system in your country. Explain why this should be a priority. Describe any efforts to establish such a system, if any.
2. Describe any project or plan to establish e-government systems at the local government level in your country. What are the project aims and objectives, components and timelines? What do you think are the project's strengths and its weaknesses? What issues need to be addressed to ensure success?

Enhancement of e-document exchange[32]

The exchange of e-documents and e-approvals has been promoted in the Republic of Korea since 1998. The target was to digitize the entire procedure of document processing in government agencies.

32 This section is drawn from "Juicy Details of Korean e-Government," *Korea IT Times*, 29 November 2007, http://www.kdcstaffs.com/it/main_view.php?mode=view&nNum=4575&parts=In-depth.

Statistics on e-document exchange show that 654 agencies have exchanged documents online through the Government e-Document Exchange Center, which includes 58 central agencies, 250 local governments, 198 educational offices and public universities, the National Assembly, and the National Election Commission. With the adoption of an e-document standard, e-approvals are currently being undertaken in 58 central agencies and 250 local governments. As of June 2006 the e-document exchange rate among central agencies was 97.3 per cent and the average rate of e-approvals was 98.2 per cent.

Table 5. e-Document exchange and e-approval rate among administrative agencies (as of June 2006)

Agency	e-Document Exchange Rate			e-Approval Rate		
	Total No. of Exchanges	No. of Electronic Exchanges	Rate (%)	Total No. of Document Production	No. of Electronic Approval	Rate (%)
Total	12,574,097	12,231,383	97.3	32,441,273	31,849,755	98.2
Central Administrative Organizations	5,114,791	4,913,759	96.1	10,951,466	10,771,392	98.4
Local Goverments	7,459,306	7,317,624	98.1	21,489,807	21,078,363	98.1
Cities/Provinces	1,135,228	1,116,287	98.3	3,410,501	3,356,823	98.4
Towns/Counties/Districts	6,324,078	6,201,337	98.1	18,079,306	17,721,540	98.0

Source: NIA, ed., 2006 Annual Report for *e-Government* (Seoul: MOGAHA, 2006), 12, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651.

The high percentage of e-document exchanges and e-approvals shows that electronic document processing has reached the stage of complete stabilization in the government agencies. All of the central agencies are securely exchanging e-documents through the government e-Document Exchange Center, and they are attempting to expand e-document exchanges to public agencies that have yet to implement e-document systems or are using non-standard e-document systems.

Archive Management System: The National Archives and Records Service implemented the Act on Archives Management in 1999 to systemically organize and manage archives. National archives management systems were established with the adoption of a data management system. Business management systems, which manage entire decision-making and business processes as well as result-oriented documents, were developed in 2005. That same year, the 'Records and Archive Management System Innovation ISP' project was launched in recognition of the need to improve the data management systems encompassing business management.

Once the archives and records management system is completed, the standard will be officially announced in consultation with relevant agencies. As a parallel effort, the National Archives and Records Service will undertake a project to establish the Central Archives and Records Management System.

Education information system and e-learning[33]

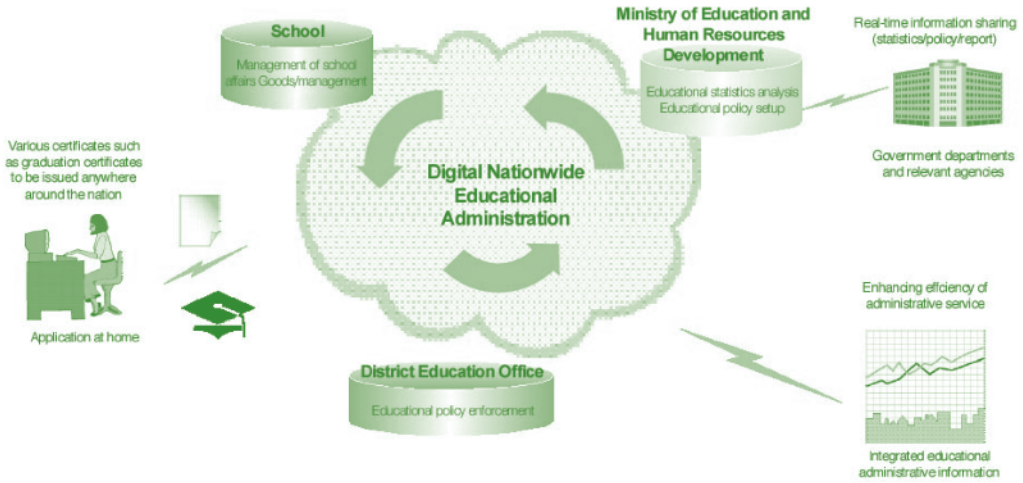
In 2002, as part of the school informatization policy in the Republic of Korea, every teacher was given a PC for use at school and one PC was allocated for every eight students. Equipment for the advancement of school facilities and Web-based school LANs were also provided to all of the country's 10,064 schools (222,146 classrooms).

However, efficiency in information sharing among related agencies was not improved as educational administration offices pursued informatization separately and there was no common standard in administrative operations.

Subsequently, the computerization of educational administration — to unify and integrate informatization resources in various educational institutions and functional units — was identified as one of the main pillars of e-government in the Republic of Korea. The objectives of education informatization include: a) constructing a foundation for enhancing administrative efficiency; b) facilitating information sharing through information networks connecting schools, provincial and metropolitan educational offices, and the Ministry of Education and Human Resources; and c) improving administrative services to meet people's needs.

Figure18. Concept of digital nationwide educational administration in the Republic of Korea

(Source: National Computerization Agency, *e-Government in Korea* (2002), 51, http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf)



Comprehensive School Information Management System: The Comprehensive School Information Management System was first introduced in 1997 to reduce routine administration work for school teachers and administrators. It consists of four subsystems: the academic affairs support system, the educational information circulation system, the school management support system and the integrated educational information system.

In the first year, the system was implemented in 168 schools. In 1998, 4,251 middle and high schools had the system. By December 2001, the system was being implemented in 1,364 elementary and middle schools (including 23 public middle and high schools) and 8,500 schools.

33 This section is drawn from National Computerization Agency, *e-Government in Korea* (2002), http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf and http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023904.pdf.

The school boards in city and provincial offices were responsible for building and operating their own EDI and budget/financial systems. To date, EDI systems are being used in 99.9 per cent of 1,614 city and provincial offices of education.

In 2000, an ISP was performed to establish the Nationwide Educational Administration Information System to handle major administrative duties (human resources and students management) in the educational sector. The aim was to reduce the processing time for education transactions by 20-50 per cent and the volume of paper documents by 30 per cent, and to increase the operational productivity of teachers by more than 25 per cent. For parents, the issuance of transcripts, certificates of registration or graduation from any school in the country would become much easier. Members of the general public would also be able to access their school records via the Internet, which will serve as a point of interaction between schools and homes.

School LAN and Internet Access-ICT Use in Education: The Comprehensive Plan for ICT Use in Elementary and Secondary Schools (1997-2002) considers ICT literacy in elementary and secondary schools to be essential to the development of creative human resources in the knowledge-based information society of the 21st century. Hence the construction of school LANs and the provision of Internet access to 10,000 schools nationwide after the nationwide educational information system was established.

LAN construction was completed in 346 schools by 1997 (3.3 per cent of total schools), in 4,902 schools by 1999 (42.8 per cent), and in 10,064 schools (100 per cent) by 2000, or two years earlier than the target. Provision of Internet access was also completed earlier than scheduled. In July 2000, the Ministry of Education and Human Resources Development, the Ministry of Information and Communication and Korea Telecom provided financial support for Internet connection. Today, all schools in the Republic of Korea are connected to the Nationwide Information Superhighway (Pubnet) or Korea Education Network.

The second phase of the Comprehensive Plan for ICT Use in Elementary and Secondary Schools, launched in 2002, aims to improve the school ICT infrastructure by increasing the network capacity to at least 2 Mbps. It will also reduce the student-PC ratio and replace and maintain multimedia equipment.

The setting up of computer labs in elementary and secondary schools has created a learning environment where students can develop independent learning abilities. PCs distributed to 340,000 teachers across the Republic of Korea have enabled them to utilize multimedia and the Internet in their classes and motivated them to actively participate in the informatization of schools. The physical foundation has been laid out to promote ICT use in the education, train high-quality human resources, and develop and distribute educational content.

e-Learning: In 2006 the e-learning expenditure of formal educational institutions, government, public institutions, businesses and individuals amounted to KRW 1.6133 trillion, representing an 11.1 per cent increase from e-learning expenditures in 2005 (KRW 1.4525 trillion). Until 2005, the demand for e-learning in the Republic of Korea came mostly from individuals. In 2006, the demand for e-learning from businesses surpassed that of individuals. Moreover, a breakdown of the increase by demand sector shows the greatest rate of increase in the government and public institutions at 45.7 per cent, followed by formal educational institutions at 42.3 per cent.[34]

34 National Information Society Agency, *2007 Informatization White Paper: Republic of Korea* (2007), 44, http://www.nia.or.kr/open_content/board/fileDownload.jsp?tn=PU_0000100&id=53922&seq=1&fl=7.

Table 6. Market value of e-learning in the Republic of Korea

Demand Sector	e-Learning Expenditures (KRW 1 million)			Rate of increase from previous year (%)
	2004	2005	2006	
Formal Educational Institutions	13,243	18,424	26,220	42.3
Government and Public institutions	83,105	94,418	137,574	45.7
Businesses	527,291	668,169	752,286	12.6
Individuals	668,996	671,509	697,227	3.8
Total	1,292,635	1,452,520	1,613,307	11.1

Source: National Information Society Agency, *2007 Informatization White Paper: Republic of Korea* (2007), 44, http://www.nia.or.kr/open_content/board/fileDownload.jsp?tn=PU_0000100&id=53922&seq=1&fl=7.

e-Learning in the Republic of Korea is underpinned by a vision of lifelong learning that includes the following:

1. Building an online learning system that will be accessible anytime, anywhere and by anybody

The government hopes to improve the quality of public education in the Republic of Korea by introducing real-time classes linking various schools online. Through various methods such as the Internet and digital TV, the government plans to stimulate 'online learning at home', which will enable the sharing of digital learning materials between schools and homes.

2. Diversifying education methods by utilizing multimedia to enhance the quality of public education

The Korean government targeted a PC-student ratio of one PC for fewer than five students and an average transmission Internet access speed of not less than 2Mbps by 2006. This is expected to encourage teachers to make extensive use of multimedia to improve the quality of teaching and learning.

3. Developing digital content especially for educational purposes to improve the online learning environment

The Korean government aims to create a multimedia environment through the development of educational software and the digitization of textbooks. There is also a plan to establish a system for sharing various educational materials, such as digital movies and photos from broadcasting companies, museums, universities and lifelong education centres.

4. Increasing the participation rate of adults in the lifelong learning system by expanding opportunities for online learning, in order to attain the level of other OECD member nations

Through various methods such as the Internet and digital TV, the Korean government intends to expand and make more effective the system of cyber universities to grant credits without being limited by time or space. The government will make the system of credit pooling more effective by conferring official credits for distance learning and job training programmes.

5. Adopting a more practical or applied approach to expand lifelong learning opportunities for workers at all levels

Government officials will be provided with online education programmes as part of an 'everyday learning system'. 'Information have-nots' will be provided with learning opportunities through a 'social learning net'. A nationwide learning network, which will include primary and secondary schools, private institutions, local lifelong education centres, and the employment information system, will be constructed to promote and support lifelong learning opportunities for all citizens.

Something To Do

Describe any effort by your government to integrate ICTs into the education system. What are the project's goals? What are the challenges in project implementation and how can these be addressed?

3.4 e-Government Infrastructure

In the previous section, ICT applications that can be developed by individual agencies or at the ministry level were discussed. It is important to note that these applications must be integrated in order to provide integrated government services. In this connection, this section will discuss the following:

- Government integrated computing and data centre
- e-Government standardization
- e-Government shared services
- e-Community centres

National Computing and Information Resources Administration Center[35]

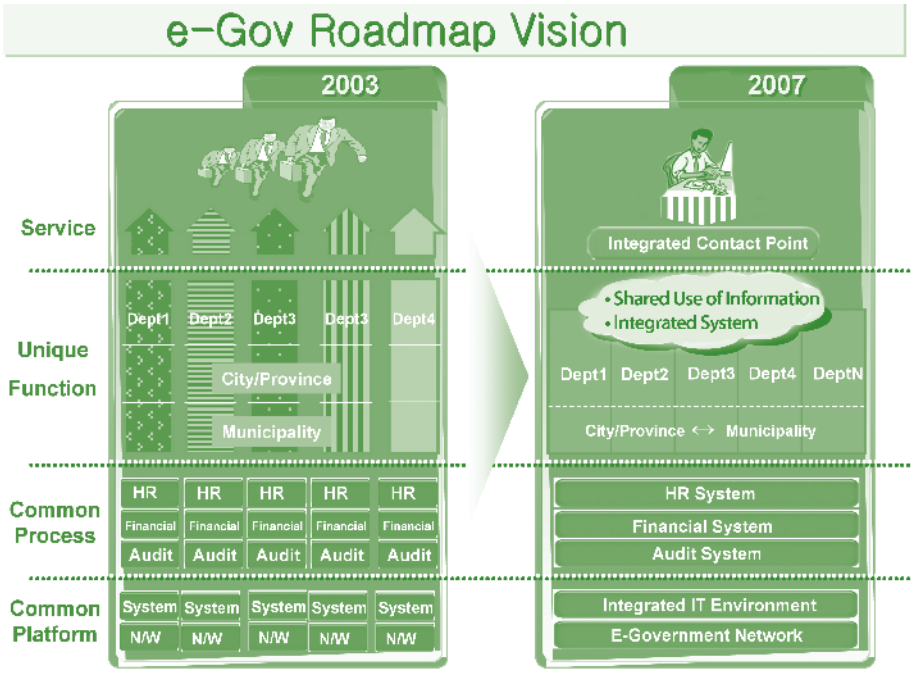
The Republic of Korea's National Computing and Information Resources Administration Center was built as a national backup system for information resources, including information systems and human resources that in the past were operated and managed by different government agencies (see Figure 19). This project aims to promote joint use of resources to improve efficiency, while at the same time serving as a backup system in case of system failures.

Center 1 and Center 2 operate an integrated information system for 48 government agencies. The first centre was built in October 2005 in Daejeon; it houses the information systems of 24 government agencies, including MOGAHA. The second centre was completed in July 2007 in Gwangju; it houses the information systems of 24 other agencies.

35 This section is drawn from Informatization Strategy Office, *Korea e-government* (Seoul: MOPAS, 2007), 30.

Figure 19. Towards an integrated system of government

(Source: Soh Bong Yu, "e-Government of Korea: How we have been working with it" (KADO presentation), 23, https://www.kado.or.kr/koil/bbs/board_view.asp?config_code=362&offset=0&board_code=3246)



Integrated Computing Center architecture

The integrated IT architecture covers four major areas: 1) integrated management, which consists of IT resources, service operations and security management; 2) infrastructure for network equipment, backup storage and security systems; 3) a Technical Engineer (human resources) for each area including Application, Database, Hardware and Network; and 4) support for each area through a help desk and administration services.

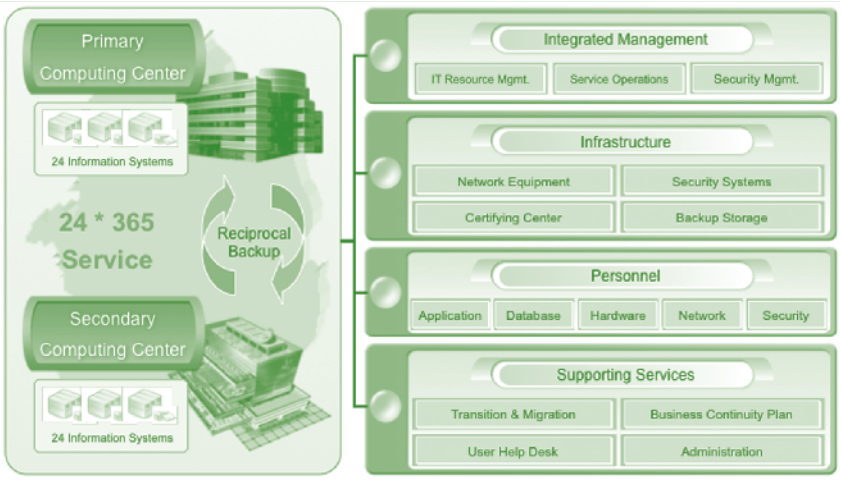
The security and stability of e-government operations are assured with world-class systems management and a standardized professional operation services. In fact, the Republic of Korea's e-government was the first public sector organization in the world to receive ISO 2000 certification.

System operation is enhanced by periodic checks to prevent failures. Professional staff is available to deal immediately with system breakdowns. In addition, security is reinforced by periodic hacking exercises, vulnerability checkups and crisis management team operation.

Continuity has been guaranteed through the successful transfer of major systems, such as the electronic customs clearance system, electronic citizen petition system and resident registration system, without interruption of the service.

Figure 20. Government Integrated Computing Center architecture

(Source: Soh Bong Yu, "e-Government of Korea: How we have been working with it" (KADO presentation), 17, https://www.kado.or.kr/koil/bbs/board_view.asp?config_code=362&offset=0&board_code=3246)



e-Government standardization

As stipulated in Article 2 of the Act on Informatization Promotion in the Republic of Korea, e-government standardization encompasses processes that make it possible to efficiently perform administrative work among government agencies or provide efficient services for citizens by using ICT. This can be broken down further into standardization for business informatization processing, administrative work, business efficiency among agencies and efficient citizen services. Together with elements for informatization — such as management, including strategy, investment/performance and organizational management; business process; information and informatization planning and budgeting; implementation; evaluation and auditing processes — a more expanded standardization scope can be established.

The expected benefits of e-government standardization are increased interoperability and efficiency as projects are integrated rather than implemented separately, enhanced reusability and common usability between systems through unified guidelines, and quality maintenance cost-savings. Germany, for instance, is expecting about one percentage point (a third of its economic growth rate) of its annual economic growth to be gained from standardization, signifying that e-government standardization can achieve more than just process innovation.

The Korean e-government framework developed in a 2005 research study systematically organizes the many dispersed elements of the informatization process. Areas such as informatization planning, design, funding, operation, assessment and oversight, along with business processes and individual agencies management, can benefit from the across-the-board standardization that this framework implements.

MOGAHA's standardization efforts have developed along with the administrative informatization process since the 1990s. MOGAHA has systemically labelled the administrative codes with the establishment of a data reference model and promoted specification standardization especially for single information systems such as PCs. Common administrative standard codes were established and 211 kinds of codes had been standardized by January 2005.

Also, multi-functional office devices were standardized in 1987 with revisions to be conducted on a biennial basis. These efforts, however, were not sufficient for the 11 key e-government initiatives established in 2001. Several attempts for standardizing e-document systems were made, but the standardization of the entire informatization process across government agencies could not be completed due to lack of personnel.

To accelerate e-government standardization in accordance with the Act on e-Government, MOGAHA has taken the standardization processes out from the information resource management project. A special focus has been put on administrative standard codes, multi-functional office devices and e-documents, and a guideline for comprehensive standardization of administrative databases is currently being developed.

To achieve a standardized code, information on the order of priority of the administrative codes of each individual agency is being collected. There are plans to consolidate the codes in stages: 10 per cent of the codes are to be consolidated in 2006, 60 per cent in 2007, and 30 per cent in 2008.

In addition, there are plans to analyse and improve on a standardized administration code established in 1990, in order to use this as a basis for constructing a standard administration code. To support these efforts a rough draft for an administrative database was drawn up in January 2006 and finalized at a meeting of the authorities responsible for informatization from 57 central government agencies in May of the same year. Currently the administrative information database is being used by 14 government agencies.

e-Government shared services[36]

e-Government shared services are information resources that can be shared among government agencies and used according to business categories and systems. They include common administrative business systems like human resources, accounting, logistics and finance, system software (operating systems, database management systems) and hardware (servers and network equipment). Generally defined, these shared services consist of small-scale programs or infrastructure systems commonly required in various departments.

In 2004 the Republic of Korea President's Committee on Government Innovation and Decentralization proposed 15 common shared services (see Table 7), nine of which were promoted separately through the G2C projects. These services have been deployed in each government agency since November 2005 and they are currently in operation at 18 systems of 11 different agencies. As shown in Table 7, the prioritized services are: citizen service information, document issuance, application forms, user-directory, integrated authentication, user identification, e-payment, web-service register and mobile SMS. Some shared services were designed for users' convenience rather than cost-saving.

36 This section is drawn from NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 38-39, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651.

Table 7. Prioritized e-government shared services in the Republic of Korea

Field	Proposed Service		Organization
Citizen Service	Prioriti-zation	Citizen Service Information	MOGAHA
		Citizen Document Issuance	
		Citizen Application Forms	
		e-Payment	
Shared Service		User Directory (LDAP)	MIC
		User Identification (PKI)	
		Integrated Authentication (SSO)	
		Mobile (SMS)	
		Web-service Register (UDDI)	
	Web Call Center		-
	e-Learning		-
	Government Directory		-
Finance/Accounting	Electronic Notification/Payment, Electronic Fund Transfer		-
Business Process	Information Disclosure		-

Source: NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 39, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651.

A master plan for exploring additional services and implementing shared services is being prepared.

Questions To Think About

What shared services among government agencies exist in your country? Which shared services should be given priority? Why?

e-Community centers

The Republic of Korea's Information Network Village (INV) project aims to achieve balanced development across the nation by building Internet communication networks in remote areas, such as farming and fishing villages. The aim is to bridge the digital gap and revitalize the local economy through the distribution of personal computers to each household and provision of computer training to the villages.

Through the INV project, an exchange between rural villages and urban cities is fostered: the rural communities are able to market their fresh farm products while city dwellers are given the opportunity to experience rural life through such revenue models as guesthouses, camps and farm experience tours.

The first 25 INVs were built in 2002. The 2007 target was 306 INVs around the country.

Test Yourself

1. As discussed in this section, it is important to integrate all government ICT systems into one. What steps must be taken in the integration process?
2. What are the benefits of establishing e-government shared services?
3. What kinds of services or activities can be provided in an e-community centre or digital community centre?

3.5 Knowledge Management System

Knowledge management can be defined as a business activity with two primary aspects: 1) treating the knowledge component of business activities as an explicit concern of business reflected in strategy, policy and practice at all levels of the organization; and 2) making a direct connection between an organization's intellectual assets, both explicit (recorded) and tacit (personal know-how), and positive business results. In practice, knowledge management encompasses identifying and mapping intellectual assets within the organization, generating new knowledge for competitive advantage within the organization, making vast amounts of corporate information accessible, and sharing best practices and technology that enables all of the above, including groupware and intranets.[37]

Knowledge management is based on the following principles:

- Knowledge is a strategic asset.
- Knowledge is a resource to be managed. As such, knowledge needs to be delivered at the right time, be made available at the right place, be present in the right shape, satisfy quality requirements and be obtained at the lowest possible costs for use in business processes.
- Knowledge in itself is not valuable; knowledge is valuable only when it leads to effective actions and results.
- Knowledge is information possessed and acted on in the human mind. The same information may lead to very different meanings and actions – by different individuals, in different organizational contexts, at different times.

Knowledge may be explicit or tacit. The first step in knowledge management is to know the 5 Ws:

- What
- Who
- Why
- When
- Where

37 Joo-Haeng Choo, "Introduction to KMS" (presentation, 2007), https://www.kado.or.kr/koil/bbs/board_download.asp?board_code=1567&bfile=2.

Table 8. Comparison between data, information and knowledge

	Data	Information	Knowledge
Content	Events	Trends	Expertise
Type	Transactions	Patterns	Learning
Task	Representation	Manipulation	Codification
Human role	Observation	Judgement	Experience
Goal	Automation	Decision-making	Action
Output	Building block	Uncertainty reduction	New understanding

Source: Knowledge Management course module, e-Government Consultant course (KADO, 2003).

The success factors in knowledge management are:

- Link to economic performance or industry value
- Technical and organizational infrastructure
- Standard, flexible knowledge structure
- Knowledge-friendly culture
- Clear purpose and language
- Change in motivational practices
- Multiple channels for knowledge transfer
- Senior management support[38]

A strategy for knowledge management includes the following steps:

1. Understand what knowledge adds value.
2. Invest to create and use knowledge effectively.
3. Recognize the value of knowledge capital to success.
4. Make knowledge accessible to everyone who can contribute to it or use it.
5. Assure top management commitment and leadership.
6. Create an atmosphere in which knowledge assets can increase.
7. Account for knowledge as a strategic asset.[39]

38 Ibid.
39 Ibid.

The Republic of Korea's e-Knowledge Management System

The real-time system for National Policy Management in the Korean government consists of two components: a Knowledge Management System (KMS) and a Government Work Management System.

The e-KMS enables various ideas proposed during the policymaking process to be recorded and managed, and subsequently shared through e-document management to enable efficient decision-making.

The e-KMS was developed as follows:

1. The presidential office adopted its first groupware.
2. An ISP was conducted to determine how to achieve a digital executive office.
3. The e-Support service was launched, focusing on recording daily journals as the first phase for the digital presidential office project.
4. A document management system was established for the third phase of the project.

With the development of the e-KMS for the presidential office, the standardization of management for information, documents and tasks has been settled. The entire administrative procedure will be integrated into a management system, once the management system for archives and knowledge is established.

With the e-KMS, archives and records can be consistently preserved without losing any information, and policymaking processes can be recorded and managed, along with identifiable commentary on policies. In addition, there will be easy access to information on similar policies, which ensures consistency in policymaking and safeguards against policy failure.

Source: Abridged from NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 20, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651.

A KMS can be established for specific areas, such as disaster management.

Knowledge Management for Disaster Risk Reduction in India

The National Disaster Risk Management Programme under the Government of India's Ministry of Home Affairs aims to a establish a knowledge network among key government agencies, policymakers, disaster managers and specialists from allied fields of engineering, architecture, planning, seismology, hydrology, agriculture and social science to facilitate the exchange of information and collaboration to reduce the risk of disaster.

To develop a community of practice, an electronic platform is being set up that will facilitate interaction among the programme partners. The system will be incentive-based and will provide stakeholders with various tools, decision support systems and monitoring systems.

In the first phase the programme will connect 500 institutions. Subsequently, various networks, such as State Networks consisting of State disaster management departments, and a Training Institution Network composed of all Administrative Training Institutions in India, will be connected.

Programme partners include:

- Disaster management practitioners in State Government Disaster Management Departments of 35 States
- National Programme for Capacity Building of Engineers for Earthquake Risk Management involving 11 National Resource Institutions (NRIs) and around 125 State Resource Institutions in all 35 States
- National Programme for Capacity Building of Architects for Earthquake Risk Management involving 7 NRIs and around 110 colleges in all 35 States
- Practitioners of Urban Earthquake Vulnerability Reduction Programme in 38 cities in 17 States
- Practitioners of National Earthquake Risk Mitigation Project in all seismic zone IV and V States
- Practitioners of National Cyclone Mitigation Project

The knowledge portal will facilitate collaboration among network members by providing tools to capture or acquire and organize knowledge related to disaster management. These tools include:

- Moderated access and facilitation
- Programme monitoring and methodology sharing tools
- Members workspace for decentralized content management
- Powerful search engines
- Moderated discussion forum for problem solving
- Document management system
- Moderated intra network e-mail groups

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» The knowledge network is envisioned to result in:

- Better response
- Empowered government Disaster Management Departments
- Better valuation of resources and services
- Integration into mainstream development
- Effective monitoring of initiatives
- Promotion of fair practices in the disaster management community

Sources: National Disaster Management Division, *ICT for Disaster Risk Reduction: The Indian Experience* (New Delhi: Ministry of Home Affairs, 2006), http://www.ndmindia.nic.in/WCDRDOCS/ICT%20for%20Disaster%20Risk%20Reduction.pdf.

National Disaster Management Division, *Knowledge Management in Disaster Risk Reduction: The Indian Approach* (New Delhi: Ministry of Home Affairs, 2006), http://www.ndmindia.nic.in/WCDRDOCS/knowledge-manageme.pdf.

Something To Do

Look for examples of knowledge management systems in agriculture, disaster management and environmental management in your country or region. Analyse each example in terms of the success factors in knowledge management.

3.6 Health and Telemedicine Applications: Increasing health services availability[40]

e-Health, which is the application of ICT in the health sector, has developed rapidly around the world in the last few years. The objective of e-health applications is to improve efficiency, access to and accountability of health care services towards better quality of life for citizens, and a more productive work environment for physicians and health care workers.

e-Health encompasses the use in the health sector of digital data — transmitted, stored and retrieved electronically — for clinical, educational and administrative purposes, both at the local site and at a distance. It makes use of various data transmission protocols and techniques. It is also all-inclusive as it involves all types of health care and health care professionals (i.e. it is not limited to medicine and it is not limited to doctors). Table 9 lists some examples of e-health.

40 This section is drawn from the ESCAP study, *e-Health in Asia and the Pacific: Challenges and Opportunities*, http://www.unescap.org/esid/hds/lastestadd/eHealthReport.pdf.

Table 9. Examples of e-health

Technology	Devices and Software	e-Health Applications
Remote monitoring	• Sensors • Instruments • Ultrasound	• Telehomecare
Diagnostics	• Stethoscope • Electrocardiograpm (EKG) • X-ray/CatScan and medical image analysis software • Consultations	• Telehomecare
Videoconferencing	• Cameras (videocams, webcams) • Computer-based desktops • Portable communication and data systems	• Consultations • Teledermatology • Telementalhealth
Digital imaging	• Instruments • Media (e.g. film, magnetic tape) • Scanners/viewers • Digital cameras • Videocams with scopes	• Telepathology • Teleradiology • Teledentistry • Teledermatology
Information technology	• Data storage systems servers • Software/informatics • Database management systems • Geographic information systems • Middleware	• Electronic medical records (e.g. patient information system, hospital information system, general practitioner information system) • Data mining, Web portals • DSS administration
Store and forward	• Data/image/audio card capture/ scanners • Computer/camera/microphone and image management software	• Electronic medical/ health records • Report generator
Simulation and training	• Multimedia graphics and software • Audio-visual	• e-Learning • Curriculum • Conference

Source: Adapted from David Brantley, Karen Laney-Cummings and Richard Spivack, *Innovation, Demand and Investment in Tele-health* (February 2004), http://www.technology.gov/reports/TechPolicy/Telehealth/2004Report.pdf.

As Table 9 shows, ICT can be utilized in four types of e-health systems:

1. Mobile health care system (Telehomecare) – Health checks and treatment can be performed using a mobile phone while the patient is travelling or at a remote location.
2. Mobile diagnostic system (Telehomecare) – Patients get a diagnosis and treatment through a hybrid type of vital signs measurement sensor and vital signs analysis system while in motion.
3. Intelligent home care medical devices (Telehomecare) – The health condition of patients at home or in retired senior citizen community centres can be monitored and diagnosed by an intelligent medical device.
4. Integrated patient management system – Devices such as PDA, mobile phones, PC/ Internet and specialized devices can be used to obtain vital signs, perform analysis and diagnostics, and systematically manage each patient.

e-Health competencies and skills are particularly significant in relation to four major e-Health application areas:

Public health policy and prevention – This area requires the collection of health, environmental and socio-economic information that enables data mining for health care strategy planning.

Information services to citizens – This area encompasses activities providing patients with information on health-related topics, such as good health and lifestyle, when professional help is required, and where and how to obtain it.

Integrated patient management and patient health records – This concerns activities surrounding the efficient and secure sharing of information between health and social care professionals, and the establishment of an environment to provide support for integrated client case management.

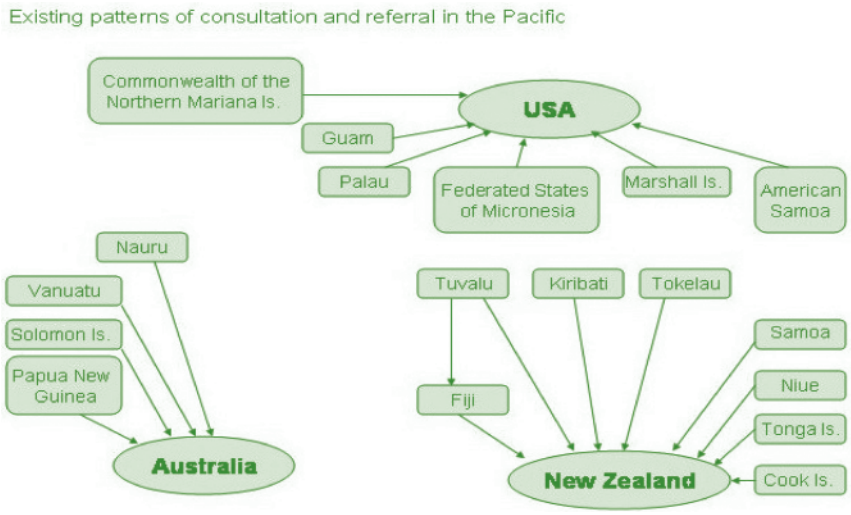
Telecare and independent living services – These include tele-consultations, telehomecare, vital signs monitoring and other services that support independent living for older people and people with disabilities.

e-Health applications have been successfully used in the following:

1. Hospital referral, particularly in the use of specialized medical technologies and skills that are otherwise unavailable in certain countries (see Figure 21).

Figure 21. Teleconsultation topology in the Pacific Islands

(Source: Isao Nakajima, "Issues concerning e-health applications in developing countries, especially in the Pacific" (presentation at the ESCAP Expert Group Meeting on "Regional trends in trade in health services, and their impacts on health system performance in the Asian and Pacific region," Bangkok, Thailand, 9-11 October 2007))



2. Health personnel education to enhance continuing education, and professional development to improve the quality and standard of practice of health professionals. An example is the Pacific Open Learning Health Network that provides continuing education opportunities to health professionals in the Pacific island countries.

Box 3. World Health Organization on e-health

e-Health has increasingly been seen as a solution to address challenges of limited resources, while meeting expectations for improved quality of health care services. The World Health Organization (WHO) recommends the use of telecommunications in health care particularly because of:

- A severe shortage of health care professionals;
- A lack (or absence) of health care for rural populations;
- High maternal and prenatal mortality rates (up to 30 per cent in some areas), which are partly triggered by lack of appropriate natal care and reproductive health services; and
- Limited or no access to medical journals after graduation by physicians, particularly those in rural and remote areas.

3. Cross-border surveillance of diseases that could become epidemics, as in the cases of the Severe Acute Respiratory Syndrome and avian influenza. Geo-informatics has been proven to be a powerful tool in effective preparation and planning for the control of pandemics by international organizations and governments. For example, the WHO has established the Global Outbreak Alert and Response Network to monitor outbreaks of avian influenza and other infectious diseases.

4. Medical transcription and medical records, where trained individuals transcribe medical records dictated by physicians and other health care providers.

5. Efficiency, in particular the elimination of duplication or errors, savings in time and travel costs, as well as more efficient allocation of human and other resources. Efficiency results from:

    - Improved knowledge sharing, along with care plan management;
    - Direct patient care through telemedicine and delivery of medications; and
    - Linking clients and physicians through an interactive video conferencing system that allows direct patient care as well as the monitoring of chronic diseases.

6. Reduction of distance/isolation, with the coverage of health care services extended to remote or rural villages that lack easy access to hospitals and medical facilities. Multi-purpose telecentres can help provide public health information and the necessary infrastructure for diagnostic medical services through telemedicine. Electronic health records allow the timely transferral of health information, enabling those who are in remote areas to consult with a specialist in another location.

Questions To Think About

1. What e-health services are available in your country? Which of these are accessible to rural communities?
2. The role of mobile phones in e-health is becoming more important than ever before. What types of health care services can be provided using mobile phones in your country?
3. Do you know of e-health programmes in your country or region that make use of community e-centres? Describe one or two of these programmes.

3.7 Disaster Management Application: Integrated national disaster management services[41]

An efficient national emergency management system is needed to minimize the impact of natural and artificial disasters. In the Republic of Korea, the National Emergency Management Agency focuses on prevention-oriented disaster management, rather than reconstruction and compensation. Accordingly, it has set up the National Disaster Management System (NDMS) that has developed and deployed disaster monitoring systems to 10 government agencies, including the Ministry of Agriculture and Forestry, and the Ministry of Maritime Affairs and Fisheries. NDMS also established in 2006 a cross-governmental disaster management network on a pilot basis to strengthen partnerships among 71 agencies. Information delivery processes for emergency situations have been simplified with the establishment of direct channels between central agencies and between upper and lower local governments, resulting in more efficient response to disasters and emergencies. In emergency rescue, the system enables the identification of those who report accidents and their location through a reporter identification system. This resulted in a 1.3 per cent reduction in false reporting of emergencies in 2005. The services can be easily accessed by people with language difficulties, foreigners

41 This section is drawn from NIA, ed., *2006 Annual Report for e-Government* (Seoul: MOGAHA, 2006), 23, http://www.nia.or.kr/open_content/common/fileList/fileList.jsp?tn=PU_0000100&id=54651.

and the elderly. When the u-Safe Korea Project is completed around 2010, it is expected that the death toll from disasters will be reduced to 11.1 persons per 1 million, representing a 33 per cent reduction from the current 16.5 persons per 1 million. Annual average property loss is also expected to go down to 8.2 per cent, resulting in savings of more than USD 35 billion in damages from 2010 to 2014.

The tsunami that occurred in 2004 led to the development of an integrated disaster management system called Sahana.

The Sahana Disaster Management System

Sahana is a Web-based disaster management application for managing information during relief operations, recovery and rehabilitation developed by a group of IT volunteers from Sri Lanka, headed by the Lanka Software Foundation.

Sahana is a free and open source software (FOSS) application, which means all users can use, copy, distribute and modify the software for a very low cost. This is critical for most countries in the Asia Pacific region. FOSS also enables systems to be modified to specific circumstances or specific disasters, making the system re-usable for the future and open for further development by IT professionals from around the world *(see Module 4 in the Academy of ICT Essentials for Government Leaders module series to find out more about FOSS)*.

The core Sahana system is divided into the following independent modules that are interconnected through shared databases:

- Organization registry – keeps track of and coordinates organizations and the role they play in the relief effort.
- Request management system – records and tracks all requests for support from various locations (camps, hospitals, etc.), and support from relief providers.
- Camp registry – registers all temporary camps, hospitals and locations for victims of the disaster.
- People (missing person) registry – database of persons who are missing, displaced or dead, as well as people searching for relatives and those who have been found or located (including pictures, finger prints, DNA samples) with advanced searched capabilities.
- Assistance (volunteer) management system – database of all pledges of assistance (from relief organizations, government agents, camps etc) and attempts to match these to requests.
- Inventory management – tracks the location, quantities and expiry of supplies in storage.
- Situation awareness – provides a geographical information system overview of the current situation to aid in decision-making.

There are also a number of optional modules that can be used, including a volunteer coordination system and mobile messaging.

Apart from the 2004 Tsunami implementation in Sri Lanka, Sahana has been deployed by various organizations in China, Indonesia, Pakistan, Peru, the Philippines and the US in response to disasters, as follows:

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Center of National Operations, Sri Lanka as part of their web portal	2005
After the Kashmir/Pakistan Earthquake by the Government of Pakistan	
After the Guinsaugon Landslide by the Government of the Philippines	2006
Sarvodaya, an NGO in Sri Lanka	
Terre des Hommes, an NGO in Sri Lanka	
After the Jogjakarta Earthquake, Indonesia	
After the Peru Earthquake	2007
New York City Office of Emergency Management, United States of America	
After the Sichuan Earthquake, China	2008

Continuous testing and development for Sahana is taking place in Ecuador, Indonesia, Lebanon and the Philippines.

For more information on the Sahana system, including the project documentation, visit http://www.sahana.lk/.

Sources: Chamindra De Silva, "Humanitarian-FOSS: Case Study on Disaster Management" (presentation made at ISCRAM 2007, 26-27 August 2007, Harbin, China), http://chamindra.googlepages.com/Sahana-Overview-ISCRAM-China-AUG-200.pdf.

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SUMMARY

This module discussed the following key concepts and principles in e-government systems development:

1. Public demand and support for e-government is essential. e-Government will be successful if there is strong demand and support for it from citizens and businesses. In most cases, getting public support can be difficult due to the following reasons:

   a. Very few people understand what benefits e-government can bring them.
   b. Few people know how to make use of available e-government services.

   One way to address these two problems is to develop truly compelling content for e-government applications. Such content would give rise to what are known as 'killer' ICT applications in G2C and G2B.

2. Multi-channel single-window government is becoming increasingly popular because a multi-channel approach means different levels of access (e.g. through the Internet, e-mail, mobile, digital TV), which encourages more participation by citizens and businesses in e-government. This approach makes e-government services more citizen-friendly.

3. There are many stakeholders in e-government. Different ICT applications in the areas of government-to-citizen (G2C) services, government-to-businesses (G2B) services and government-to-government (G2G) services will help meet the different needs of these stakeholders.

4. The integration of government-wide computing resources such as hardware, network infrastructure, IT personnel and management will produce many benefits, including cost reduction and management efficiency.

5. e-Government standardization gives rise to positive outcomes such as interoperability, consistency, reusability and quality maintenance.

6. e-Government is not a single event or one-shot approach but a long-term evolutionary process. The paradigm for government has shifted from control and management to efficiency, transparency and participation through innovation.

7. e-Government of the future will be characterized by seamless and consolidated services, and greatly enhanced reliability and transparency of government as new advanced information technology evolves (e.g. m-Government and u-Government).

ANNEX

Further Reading

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Glossary

Business Process Reengineering	Redesign of the work flow within or between department levels to increase process efficiency (i.e. to eliminate inefficiency in the work process).
c-Commerce	Collaborative commerce, a business model where a company integrates its systems with those of its suppliers and partners across the Internet. It is supported by a growing number of B2B applications that automate key business processes in a supply chain extending beyond the enterprise boundaries, from raw materials to finished products.
e-Commerce	Electronic commerce, the buying and selling of goods and services through the Internet, especially the World Wide Web.
e-Government	The use of digital technologies to transform government operations in order to improve effectiveness, efficiency and service delivery.
e-Health	Electronic health, the application of ICT in the health sector to improve the efficiency, access to and accountability of health care services towards better quality of life for citizens and a more productive work environment for physicians and health care workers.
e-Learning	Electronic learning, a general term used to refer to a form of learning in which the instructor and student are separated by space or time, and where the gap between the two is bridged through the use of online technologies.
Killer Application	A certain usage of technology and service that makes the technology and service popular and successful. The term is especially appropriate when a previous version of the technology did not take off before the introduction of the killer application.
Knowledge Management	A business activity with two primary aspects: 1) treating the knowledge component of business activities as an explicit concern of business reflected in strategy, policy and practice at all levels of the organization; and 2) making a direct connection between an organization's intellectual assets, both explicit (recorded) and tacit (personal know-how), and positive business results.
m-Government	The use by governments of mobile phone technologies to interact with their citizens. For example, a security alert can be sent out as an SMS message to those travelling in unsafe countries.
t-Government	Interactive terrestrial digital TV-based e-service delivery via specially designed government TV channels/portal, with both broadcast and on-demand content. In the Republic of Korea, the 'T-Gov' programme will make two-way communication between the government and the public possible through television.
u-Government	The 'U' stands for 'ubiquitous', which is defined as communication between devices, things, humans and computers anytime and anywhere. All devices or things will be embedded in computing and then networked through wired or wireless connections. Under the u-Government programme, citizens will be able to access government services anytime and anywhere through multi-channel devices (based on mobile technologies).

Notes for Trainers

As noted in the section entitled 'About The Module Series', this module and others in the series are designed to have value for different sets of audiences and in varied and changing national conditions. The modules are also designed to be presented, in whole or in part, in different modes, on- and off-line. The module may be studied by individuals and by groups in training institutions as well as within government offices. The background of the participants as well as the duration of the training sessions will determine the extent of detail in the presentation of content.

These 'Notes' offer trainers some ideas and suggestions for presenting the module content more effectively. Further guidance on training approaches and strategies is provided in a handbook on instructional design developed as a companion material for the *Academy of ICT Essentials for Government Leaders* module series. The handbook is available at: http://www.unapcict.org/academy.

Using the Module

Each section of the present module begins with a statement of learning objectives and ends with a set of 'Test Yourself' questions. Readers may use the objectives and questions as a basis for assessing their progress through the module. Each section also contains discussion questions and practical exercises that may be accomplished by individual readers or used by trainers. These questions and exercises are designed to enable readers to draw on their own experience to benchmark the content and to think reflectively on the issues presented.

Case studies form a significant part of the module content. These are intended for discussion and analysis, particularly in terms of the extent to which the key concepts and principles presented in the module work in real-world projects and programmes. It is important for readers to appreciate the need to adapt ICT-based and ICT-supported approaches and models to suit local conditions. Trainers may encourage participants to cite other cases and examples from their own experience to substantiate the content of the module.

Structuring the Sessions

Depending on the audience, time available and local settings and conditions, the content of the module can be presented in different structured time capsules. What could be covered in sessions of different durations is outlined below. Trainers are invited to modify the session structure based on their own understanding of the country and audience.

For a 90-minute session

Aim to develop a basic understanding of e-government, including why it is useful and the critical factors for the success of e-government projects discussed in Section 1.

For a three-hour session

After a general discussion of the rationale for e-government and the critical success factors, provide an overview of models of e-government and e-government strategic planning leading to the formulation of a roadmap for e-government implementation. The relevant discussion and exercises are in Section 2.

For a one-day session (six hours duration)

This time frame would allow for an exploration of one or two of the e-government applications presented in Section 3, in addition to the overview of e-government principles, models and strategic planning provided in Sections 1 and 2. Focus on the e-government application/s that is/are of most relevance to the participants, and use the relevant discussion questions ('Questions To Think About') and learning activities ('Something To Do') to make the session interactive.

For a three-day session

This time frame should enable you to cover the entire module, including intensive discussions of relevant case studies of specific e-government applications. Include a 'live' case study via a field trip to a local e-government implementation project site. Make time also for some e-government strategic planning by the participants, the outcomes of which would be presented to the rest of the group.

About the Author

Nag Yeon Lee is currently an IT consultant in e-government and IT advisor for many organizations including Hyundai Information Technology where he was Senior Vice President for over 10 years. He has extensive experience in international business development with IT solutions. He was Vice Chairman of the Korea Ultra Wide Band Forum where he worked on issues related to wireless communication such as WiFi, Wimedia, WiMax and Wibro. He was also an instructor for the Korea IT Learning Program where he was involved in the development of modules for overseas high-level IT experts on: 1) e-government: implementation strategy, applications (G2B, G2C, national finance system, tax system, security system, e-health, e-learning); and 2) ISP, business process re-engineering and change management. He received a Special Achievement Award from the Prime Minister of the Republic of Korea in 2002.

UN-APCICT

The United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (UN-APCICT) is a subsidiary body of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). UN-APCICT aims to strengthen the efforts of the member countries of ESCAP to use ICT in their socio-economic development through human and institutional capacity-building. UN-APCICT's work is focused on three pillars:

1. Training. To enhance the ICT knowledge and skills of policymakers and ICT professionals, and strengthen the capacity of ICT trainers and ICT training institutions;
2. Research. To undertake analytical studies related to human resource development in ICT; and
3. Advisory. To provide advisory services on human resource development programmes to ESCAP member and associate members.

UN-APCICT is located at Incheon, Republic of Korea.

http://www.unapcict.org

ESCAP

ESCAP is the regional development arm of the United Nations and serves as the main economic and social development centre for the United Nations in Asia and the Pacific. Its mandate is to foster cooperation between its 53 members and 9 associate members. ESCAP provides the strategic link between global and country-level programmes and issues. It supports Governments of countries in the region in consolidating regional positions and advocates regional approaches to meeting the region's unique socio-economic challenges in a globalizing world. The ESCAP office is located at Bangkok, Thailand.

http://www.unescap.org

The Academy of ICT Essentials for Government Leaders

http://www.unapcict.org/academy

The *Academy* is a comprehensive ICT for development training curriculum with eight initial modules that aims to equip policymakers with the essential knowledge and skills to fully leverage opportunities presented by ICTs to achieve national development goals and bridge the digital divide.

Module 1 – The Linkage between ICT Applications and Meaningful Development

Highlights key issues and decision points, from policy to implementation, in the use of ICTs for achieving the Millennium Development Goals.

Module 2 – ICT for Development Policy, Process and Governance

Focuses on ICTD policymaking and governance, and provides critical information about aspects of national policies, strategies and frameworks that promote ICTD.

Module 3 – e-Government Applications

Examines e-government concepts, principles and types of applications. It also discusses how an e-government system is built and identifies design considerations.

Module 4 – ICT Trends for Government Leaders

Provides insights into current trends in ICT and its future directions. It also looks at key technical and policy considerations when making decisions for ICTD.

Module 5 – Internet Governance

Discusses the ongoing development of international policies and procedures that govern the use and operation of the Internet.

Module 6 – Network and Information Security and Privacy

Presents information security issues and trends, and the process of formulating an information security strategy.

Module 7 – ICT Project Management in Theory and Practice

Introduces project management concepts that are relevant to ICTD projects, including the methods, processes and project management disciplines commonly used.

Module 8 – Options for Funding ICT for Development

Explores funding options for ICTD and e-government projects. Public-private partnerships are highlighted as a particularly useful funding option in developing countries.

These modules are being customized with local case studies by national *Academy* partners to ensure that the modules are relevant and meet the needs of policymakers in different countries. The modules are also been translated into different languages. Furthermore, these modules will be regularly updated to ensure their relevance to policymakers, and new modules will be developed that focus on ICTD for the 21st century.

APCICT Virtual Academy (AVA – http://ava.unapcict.org)

- An online distance learning platform for the *Academy*.
- Designed to ensure that all the *Academy* modules including virtual lectures, presentations and case studies are accessible online.
- Enables learners to study the materials at their own pace.

e-Collaborative Hub (e-Co Hub – http://www.unapcict.org/ecohub)

- A resources portal and knowledge sharing network for ICTD.
- Provides easy access to resources by module.
- Users can engage in online discussions and become part of the e-Co Hub's online community of practice that serves to share and expand the knowledge base of ICTD.

Register online to fully benefit from the services provided in AVA and the e-Co Hub at http://www.unapcict.org/join_form