

Academy of ICT Essentials for Government Leaders

Module 3

e-Government Applications

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and
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The Academy of ICT Essentials for Government Leaders Module Series

Module 3: e-Government Applications

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FOREWORD

The world we live in today is inter-connected and fast-changing, largely due to the rapid development of information and communication technologies (ICTs). As the World Economic Forum fittingly states, ICTs represent our “collective nerve system”, impacting and connecting every fabric of our lives through intelligent, adaptive and innovative solutions. Indeed, ICTs are tools that can help solve some of our economic, social and environmental challenges, and promote more inclusive and sustainable development.

The increased access to information and knowledge through development of ICT has the potential to significantly improve the livelihoods of the poor and marginalized, and promote gender equality. ICTs can serve as a bridge connecting people from different countries and sectors in the region and beyond by providing more efficient, transparent and reliable means and platforms for communication and cooperation. ICTs are essential to the connectivity that facilitates more efficient exchange of goods and services. Success stories from Asia and the Pacific region abound: e-government initiatives are improving access to and quality of public services, mobile phones are generating incomes and professional opportunities for women and the voices of the vulnerable are louder than ever through the power of social media.

Yet, the digital divide in Asia and the Pacific is still seen to be one of the widest in the world. This is evidenced by the fact that the countries of the region are placed across the whole spectrum of the global ICT Development Index ranking. Despite the impressive technological breakthroughs and commitments of many key players in the region, access to basic communication is still not assured for all.

In order to complete the bridging of the digital divide, policymakers must be committed to further realizing the potential of ICTs for inclusive socio-economic development in the region. Towards this end, the Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT) was established as a regional institute of the United Nations Economic and Social Commission for Asia and the Pacific (UN/ESCAP) on 16 June 2006 with the mandate to strengthen the efforts of the 62 ESCAP member and associate member countries to use ICT in their socio-economic development through human and institutional capacity development. APCICT's mandate responds to the Declaration of Principles and Plan of Action of the World Summit on the Information Society (WSIS), which states that: “Each person should have the opportunity to acquire the necessary skills and knowledge in order to understand, participate actively in, and benefit fully from, the Information Society and the knowledge economy.”

In order to further respond to this call to action, APCICT has developed a comprehensive information and communication technology for development (ICTD) training curriculum, the *Academy of ICT Essentials for Government Leaders*. Launched in 2008 and based on strong demand from member States, the *Academy* presently consists of 10 stand-alone but interlinked modules that aim to impart essential knowledge and expertise to help policymakers plan and implement ICT initiatives more effectively. Widespread adoption of the *Academy* programme throughout Asia-Pacific attests to the timely and relevant material covered by these modules.

ESCAP welcomes APCICT's ongoing effort to update and publish high quality ICTD learning modules reflecting the fast-changing world of technology and bringing the benefits of ICTD knowledge to national and regional stakeholders. Moreover, ESCAP, through APCICT, is promoting the use, customization and translation of these *Academy* modules in different countries. It is our hope that through their regular delivery at national and regional workshops for senior- and mid-level government officials, the acquired knowledge would be translated into enhanced awareness of ICT benefits and concrete actions towards meeting national and regional development goals.

Noeleen Heyzer

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

PREFACE

In the effort to bridge the digital divide, the importance of developing the human resource and institutional capacity in the use of ICTs cannot be underestimated. In and of themselves, ICTs are simply tools, but when people know how to effectively utilize them, ICTs become transformative drivers to hasten the pace of socio-economic development and bring about positive changes. With this vision in mind, the *Academy of ICT Essentials for Government Leaders (Academy)* was developed.

The *Academy* is the flagship programme of the United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT), and is designed to equip government officials with the knowledge and skills to fully leverage ICT for socio-economic development. The *Academy* has reached thousands of individuals and hundreds of institutions throughout the Asia-Pacific and beyond since its official launch in 2008. The *Academy* has been rolled out in over 20 countries in the Asia-Pacific region, adopted in numerous government human resource training frameworks, and incorporated in the curricula of university and college programmes throughout the region.

The impact of the *Academy* is in part a result of the comprehensive content and targeted range of topics covered by its eight initial training modules, but also due to the *Academy's* ability to configure to meet local contexts and address emerging socio-economic development issues. In 2011, as a result of strong demand from countries in the Asia-Pacific, APCICT in partnership with its network of partners developed two new *Academy* training modules designed to enhance capacity in the use of ICT for disaster risk management and climate change abatement.

Adhering to APCICT's "We D.I.D. It In Partnership" approach, the new *Academy* modules 9 and 10, like the initial modules 1 to 8, were Developed, Implemented and Delivered in an inclusive and participatory manner, and systematically drew upon an extensive and exceptional group of development stakeholders. The entire *Academy* has been based on: needs assessment surveys from across the Asia-Pacific region; consultations with government officials, members of the international development community, and academics and educators; research and analysis on the strengths and weaknesses of existing training materials; and a peer review process carried-out through a series of APCICT organized regional and sub-regional workshops. These workshops provided invaluable opportunities for the exchange of experiences and knowledge among users of the *Academy* from different countries. The result is a comprehensive 10-module *Academy* curriculum covering a range of important ICTD topics, and indicative of the many voices and contextual nuances present across the region.

APCICT's inclusive and collaborative approach to development of the *Academy* has also created a network of strong partnerships to facilitate the delivery of ICTD training to government officials, policymakers and development stakeholders throughout the Asia-Pacific region and beyond. The *Academy* continues to be rolled out and adopted into training frameworks at the national and regional levels in different countries and regions as a result of close collaboration between APCICT and training institutions, government agencies, and regional and international organizations. This principle will continue to be a driving force as APCICT works with its partners to continuously update and further localize the *Academy* material, develop new *Academy* modules to address identified needs, and extend the reach of *Academy* content to new target audiences through new and more accessible mediums.

Complementing the face-to-face delivery of the *Academy* programme, APCICT has also developed an online distance learning platform called the APCICT Virtual Academy (<http://e-learning.unapcict.org>), which is designed to enable participants to study the material at their own pace. The APCICT Virtual Academy ensures that all the *Academy* modules and accompanying materials are easily accessible online for download, dissemination, customization and localization. The *Academy* is also available on DVD to reach those with limited or no Internet connectivity.

To enhance accessibility and relevance in local contexts, APCICT and its partners have collaborated to make the *Academy* available in English, Bahasa Indonesia, Mongolian, Myanmar language, Russian, Tajik and Vietnamese, with plans to translate the modules into additional languages.

Clearly, the development and delivery of the *Academy* 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 our partners from government ministries, training institutions, and regional and national organizations who have participated in *Academy* workshops. They not only provided valuable inputs to the content of the modules, but more importantly, they have become advocates of the *Academy* in their countries and regions, and have helped the *Academy* become an important component of national and regional frameworks to build necessary ICT capacity to meet the socio-economic development goals of the future.

I would like to extend heartfelt acknowledgments to the dedicated efforts of the many outstanding contributors who have made Module 3 possible, with a special note of gratitude to module authors Nag Yeon Lee and Kwangsok Oh. I would also like to thank the more than 7,500 participants that have attended over 80 *Academy* workshops in over 20 countries, as well as online trainings. Their invaluable insight and feedback have helped to make sure that the *Academy* has had a lasting impact.

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/ESCAP

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 UN-APCICT/ESCAP 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—with virtual classrooms featuring the trainers’ presentations in video format and presentation slides of the modules (visit <http://e-learning.unapcict.org>).

In addition, APCICT has developed an e-Collaborative Hub for ICTD, or 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 (UNDP)
ASYCUDA	Automated System for Customs Data
B2B	Business-to-Business
B2C	Business-to-Consumer
B2G	Business-to-Government
BOC	Bureau of Customs (Philippines)
BPR	Business Process Reengineering
C2C	Consumer-to-Consumer
CIC	Community Information Centre (Bangladesh)
CMM	Capability Maturity Model
CMMI	Capability Maturity Model Integrated
EAF	e-Government Assessment Framework (India)
EDI	Electronic Data Interchange
eGEP	e-Government Economics Project (European Union)
eRPTS	Electronic Real Property Tax System (Philippines)
ESCAP	Economic and Social Commission for Asia and the Pacific (UN)
FOSS	Free and Open Source Software
G2B	Government-to-Business
G2C	Government-to-Citizen
G2E	Government-to-Employees
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)
IPTV	Internet Protocol Television
ISO	International Organization for Standardization
ISP	Information Strategy Planning
IT	Information Technology
ITU	International Telecommunication Union
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)
NAFIS	National Financial Management System (Republic of Korea)
NCA	National Computerization Agency (Republic of Korea)
NCC	National Computer Center (Philippines)
NCIA	National Computing and Information Agency (Republic of Korea)
NDMS	National Disaster Management System (Republic of Korea)
NECTEC	National Electronics and Computer Technology Center (Thailand)
NGO	Non-Governmental Organization

NIA	National Information Society Agency (Republic of Korea)
NRI	National Resource Institution (India)
NTS	National Tax Service (Republic of Korea)
OECD	Organisation for Economic Co-operation and Development
PC	Personal Computer
PDA	Personal Digital Assistant
PFnet	People First Network (Solomon Islands)
RIC	Rural ICT Centre (Bangladesh)
RTC	Rural Technology Centre (Bangladesh)
SME	Small and Medium Enterprise
SMS	Short Messaging Service
TV	Television
UK	United Kingdom
UN	United Nations
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNOPS	United Nations Office for Project Services
US	United States
WHO	World Health Organization

List of Icons



Case Study



Questions To Think About



Something To Do



Test Yourself

1. OVERVIEW OF E-GOVERNMENT

1.1 Defining e-Government

There are many definitions of e-government. Broadly, e-government can be defined as the application of information and communication technologies (ICTs) to enhance the performance of 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 Accordingly, e-government should leverage ICTs to help the public sector operate more efficiently and provide better services to internal constituents, citizens and businesses.

Most of the current definitions of e-government can be summarized by using four basic elements. e-Government is characterized by:

1. The use of ICTs (computer networks, Internet, faxes, and telephones)
2. The support of government actions (to provide information, services, products, administration)
3. The improvement of government relationships with citizens (through the creation of new communication channels or the promotion of citizen engagement in the political or administrative process)
4. The following of a strategy oriented to add value to the participants in the process²

Table 1. Definitions of e-government

United Nations ³	e-Government is defined as utilizing the Internet and World Wide Web for delivering government information and services to citizens.
World Bank ⁴	e-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management.
OECD ⁵	The term “e-government” focuses on the use of new ICTs by governments as applied to the full range of government functions. In particular, the networking potential offered by the Internet and related technologies has the potential to transform the structures and operation of government.

1 Mark A. Forman, “e-Government: Using IT to transform the effectiveness and efficiency of government”, presentation dated 15 June 2005, p. 4, [http://siteresources.worldbank.org/INTEDEVELOPMENT/Resources/FormanEgov\(6_05\).ppt](http://siteresources.worldbank.org/INTEDEVELOPMENT/Resources/FormanEgov(6_05).ppt).

2 J. Ramón Gil-García and Luis Felipe Luna-Reyes, “Integrating Conceptual Approaches to e-Government”, in *Encyclopedia of E-Commerce, E-Government and Mobile Commerce*, Mehdi M. Khosrow-Pour, (ed.) (Hershey, P.A., Idea-Group Publishing, 2006), pp. 636-643.

3 United Nations Division for Public Economics and Public Administration and American Society for Public Administration, *Benchmarking E-government: A Global Perspective - Assessing the UN Member States* (2002), p. 1, <http://www.unpan.org/Portals/0/60yrhistory/documents/Publications/Benchmarking%20E-Government.2002.pdf>.

4 The World Bank, “Definition of e-Government”, <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTGOVERNMENT/0,,contentMDK:20507153~menuPK:702592~pagePK:148956~piPK:216618~theSitePK:702586,00.html>.

5 OECD, “e-Government: Analysis Framework and Methodology”, OECD Public Management Service, Public Management Committee, 13 December 2001, p. 2, [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=PUMA\(2001\)16/ANN/REV1&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=PUMA(2001)16/ANN/REV1&docLanguage=En).

To deliver the promises of e-government, many countries have placed e-government development on their political agendas. The initial focus was given to increasing the efficiency and effectiveness of government operations through the use of ICTs. However, with the limited impact of government investments in e-government services, the focus shifted towards a citizen-centric approach in the mid-2000s. This led to a significant change, from prioritizing outcomes for governments to ensuring that the diverse needs of citizens are met in terms of public service delivery. Today, it is well recognized that e-government is not only a crucial tool to support and enhance public sector functions and processes, but it is also a key enabler in transforming government and creating new approaches to service development and delivery.

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 citizens. Thus, it is necessary to establish a high-level e-government road map (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 process of developing policies and strategies to effectively utilize ICTs for development, which form the basis for establishing an e-government road map. This module discusses bottom-up implementation, focusing on e-government applications.

In general, the more services are available online and the more widespread the use of these services, the greater 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. Reaching the critical mass for e-government services may require aggressive shifting of citizens away from traditional channels, and moving them towards an e-government channel, which 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 programmes 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.⁶

e-Government is likely to succeed only if there is strong demand and support 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 easily accessible digital content and services. Furthermore, governments need to increase public confidence in their electronic services by ensuring data security and privacy. In particular, the following must be implemented to increase demand and support for e-government services:

- Develop a multi-channel single-window common service delivery infrastructure, including offline 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 and user-friendly contents and services, including so-called “killer applications”; and
- Implement programmes aimed at improving accessibility and affordability of e-services.

⁶ The 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), p. 11.



Something To Do

1. Discuss the four basic elements of e-government.
2. 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.
3. Identify one e-government service that is not as popular as the example you cite in #2 above and list specific ways of motivating citizens and businesses in your country to use or participate in such a service.

1.2 General Framework for e-Government

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 accomplish these four objectives, e-government at multiple layers of government must be established. There are three major tasks at each of these levels of government: (1) innovating citizen services (G2C); (2) innovating business services (G2B); and (3) innovating the way government works (G2G, G2E). e-Government has several facets and can be characterized based on intended users and their interactions.

- Government-to-Citizen (G2C) provides information, services and other functionality to citizens.
- Government-to-Business (G2B) facilitates any of the range of relationships and interactions between government and businesses.
- Government-to-Government (G2G) supports information sharing and collaboration within or between government agencies.
- Government-to-Employees (G2E) streamlines internal processes and improves productivity by facilitating the management of civil service and communication between government and government employees.

In terms of interaction with citizens and the visibility of the services provided, e-government can be logically broken up into two parts: front office and back office. The front office refers to government as its constituents see it, meaning the information and service providers, and the interaction between the government, citizens and businesses.⁷ G2C embraces information dissemination and public services to the citizens, while G2B includes various transactions between government and businesses. ICT-enabled G2C services are delivered through a government-wide information sharing system and applications that allow citizens to access information and other services using a single-window online portal. Such a portal can provide the following services to citizens:

⁷ OECD, "The e-government imperative: Main findings", OECD Policy Brief, March 2003, <http://www.oecd.org/dataoecd/60/60/2502539.pdf>.

- Application and issuance of various permits/licences and certificates
- Provision of information on legislative/administrative notices and relevant laws
- Payment services, including tax refunds and social welfare payments
- Opportunities to participate in public affairs through e-consultation, e-deliberation and e-voting

To establish a citizen-centric portal and public information sharing system, the key databases for public management, including resident registration, real estate, vehicle, tax, and insurance, need to be interconnected or integrated.

Electronic G2B service includes corporate civil administrative affairs, provision of industrial information, and electronic transactional services such as procurement, bids and awards, and payment services for various taxes and public charges. Among others, the following ICT applications are required for effective electronic G2B service delivery:

- An integrated e-procurement system – i.e. a single-window government procurement system in which all procurement-related processes, such as registration, tender, contract and payment are conducted online.
- An e-customs system that enables paper-free customs administration in the import and export industries, and establishes 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 3.



Test Yourself

Using the definitions given above as well as your personal knowledge of government services, categorize the following as either G2C or G2B.

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

The back office involves the internal operations of a government that support core processes and are not accessible or visible to the general public. The implementation of e-government goes hand-in-hand with a number of back office reforms. e-Government underpins these reforms, while such reforms are necessary if e-government is to be successful.⁸

Electronic G2G delivery aims to streamline internal work processes and to improve productivity. More specifically, streamlining government work processes through the use of ICT is expected to have the following outcomes:

⁸ Ibid.

- Connected reporting system within and between central and local governments, resulting in increased accuracy
- Information sharing among agencies in the form of database sharing, leading to enhanced efficiency
- Exchanging of ideas and sharing of resources among government agencies
- Collaborative decision-making through online collaboration platform

Digitizing document processing in government agencies and moving towards paperless government operations are key G2G initiatives. e-Document exchange is expected to result in faster, more efficient, secure and reliable 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 were previously operated independently in various government agencies.

Local e-Government Information System: Standardization and informatization of 21 common administrative affairs for 244 local governments, such as resident registration, real estate, finance and taxation 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 district offices, 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.

G2G systems require the following:

- Establishing electronic work processes
- Electronic document processing
- Knowledge management system
- Integration of back offices

G2G requires collaborative partnerships and use of ICT to perform cross-agency work. While G2G is usually not apparent to citizens and businesses, it often becomes a component of G2C or G2B. Developing G2G applications as a way to deliver G2C or G2B services occurs when two or more government entities are required to complete a particular transaction for citizens or businesses. In order to provide G2C or G2B services, two or more government entities need to connect their business processes by interconnecting multiple databases. As a result, getting G2G cross-agency projects started and funded tends to be difficult.



Something To Do

1. 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.
2. Describe the relationship between G2G and G2C or G2B for cross-agency services.

1.3 Benefits of e-Government

On the whole, e-government can offer a number of benefits, including better quality government services, higher efficiency, less costs, a lower administrative burden on citizens and businesses, shorter processing times, increased citizen participation in the decision-making process, and enhanced transparency. Table 2 elaborates on the beneficial changes to government work processes through the effective use of ICTs.

Table 2. Changes in government work processes from e-government

From	To
Paper-based government work processes	Electronic work processes
Department-oriented silo procedures	Service-oriented connected 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, leading to duplication and redundancy among departments and agencies	Government-wide information resource management using a common standard

In addition, e-government helps build trust between government and citizens by promoting direct interaction and making information more accessible and freely available. Building trust between governments and citizens is fundamental to good governance.

e-Government is recognized as an enabler for larger government modernization programmes, and can be a major contributor to government modernization. As the use of ICTs has increased rapidly throughout the Asian countries, governments are facing new demands and competitive pressures from citizens and the business community to introduce ICT-enabled services. 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.

Box 1. Benefits of e-government

- e-Government helps improve efficiency in government. ICTs are a necessary enabler of reforms to the ways in which public administrations work. Improving internal operating systems—financial systems, purchasing and payment arrangements, internal communications and sharing of information—and programme processing and delivery arrangements can generate operating efficiencies and improve performance.
- Enhanced quality of service has been a major component of public administration reform over the past two decades, and the use of ICTs to generate improvements in services has been a primary driver for e-government activity. In particular, the use of the Internet has given a major boost to customer focused, seamless services, which aim to transcend the structure of public administrations. Online services are increasingly seen as part of a broader services strategy, with important customer and efficiency benefits. As users of public services are often obliged to interact with government, user dissatisfaction with the quality of government services can quickly become a major political issue.
- ICTs can support more effective outcomes in key policy areas such as health, welfare services, security and education. Ultimately, governments and public administrations exist to deliver policy outcomes, and ICTs are a major enabler across all major policy areas. The use of the Internet to deliver value in these areas is a major preoccupation in member countries.
- Better governance arrangements in themselves will promote economic policy objectives. More specific effects may range from impacts on ICT production, e-commerce diffusion and business productivity to indirect effects such as reduced fiscal requirements owing to more effective programmes and efficiencies flowing through to the broader economy.
- e-Government can help forward the reform agenda. When aligned with modernization goals, implementing e-government can help administrations focus on the additional changes needed to meet service delivery and good governance concerns. At the same time, it provides some valuable reform tools and builds support from high-level leaders and government employees for achieving those objectives.
- Through citizen engagement, e-government can improve the overall trust relationship between government and public administrations. e-Government, by improving information flows and encouraging active participation by citizens is increasingly seen as a valuable tool for building trust between governments and citizens.

Source: Abridged from OECD, *The e-Government Imperative*, OECD e-Government Studies (Paris, 2003), pp. 28-29
<http://pavroz.ru/dov/egovimperative.pdf>.

1.4 Critical Success Factors

Critical factors for successful e-government 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, p. 25.

Vision, Objectives and Strategy

A long-term plan with a clearly articulated vision and strategy is vital to successful implementation of e-government. A quick fix or piecemeal approach will not suffice. The more effective approach is to think big in order to gain insight into what to accomplish on the “whole-of-government” (top-down design), while starting small and prioritizing tasks (bottom-up) during the implementation process.

An important concept in e-government strategy is the “whole-of-government” approach. It intends to organize services not according to the silos of individual ministries and departments, but according to the needs of citizens and businesses, cutting across organizational boundaries.⁹ The whole-of-government approach can help safeguard collaboration, while avoiding redundant investments in infrastructure and applications development.

In short, successful e-government requires:

- A clear vision by the leaders
- Strong support from citizens
- A well-articulated strategy with resource commitment

Laws and Regulations

The application of ICTs to government operations often encounters legal or regulatory issues because laws designed for the paper world can hinder e-services. It is important to ensure that laws are updated or newly enacted to recognize electronic documents and transactions.

⁹ OECD, “Denmark: Efficient e-Government for Smarter Public Service Delivery”, OECD e-Government Studies, 3 June 2010, <http://www.oecd.org/dataoecd/43/55/45382552.pdf>.

Proactive steps are needed to ensure that laws and regulations support rather than impede e-government. It is also important to take sufficient time to plan for legislative changes needed for new processes. The following laws need to be in place for e-government to succeed:

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

Institutional Arrangement

Institutional arrangement is a structure of roles and responsibilities and mechanisms for cooperation governing the behaviour of organizations and individuals within a given field. Institutional arrangement is important in that it helps to ensure collaboration within government and facilitates participation from the private sector. A well designed institutional arrangement is required to ensure collaboration and expedite implementation.

The following are important in designing institutional arrangement:

- Securing strong leadership with commitment
- Planning—information technology (IT) management and change management
- Budget preparation and budget execution
- Coordination and collaboration
- Monitoring and performance evaluation
- Setting up technology support organization
- Government-private sector-citizen partnership

Business Process

e-Government is not merely about automating existing government work processes or putting services online. Rather, the ultimate goal of e-government is to transform government. Indeed, successful e-government is about changing business processes. Critical to the success of e-government is the understanding that ICT should be applied after eliminating inefficiencies through streamlining and consolidating offline processes. The existing way of doing business may not necessarily be the most appropriate or effective. One of the tools for 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

ICTs change rapidly. Key factors to consider when choosing technology and vendors are:

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

Box 2. General principles to follow in making technology decisions

Here are some general principles to follow in making technology decisions:

Take a long-term, high-level view and observe trends. Current trends include increasing bandwidth and ubiquitous computing (anytime, anywhere). The Internet will increasingly be accessible using hand-held devices (mobile phones, PDAs, tablet PCs) with wireless connections.

Adhere to open standards. Open standards promote interoperability and platform independence, which protect technology investments by making sure they will work in the widest range of environments. They also avoid reliance on a single vendor and provide a degree of “future-proofing”.

Adopt stable rather than cutting-edge technologies. Technologies on the so-called bleeding edge tend to have higher implementation and support costs and change more rapidly than mature technologies.

Adopt appropriate and sustainable technologies. Technologies should be suited to the task, affordable and easily supported.

Source: Abridged from Stephen Marquard, *African Schoolnet Toolkit* (Vancouver, Commonwealth of Learning and Johannesburg, SchoolNet Africa, 2005), pp. 44–45, <http://www.col.org/SiteCollectionDocuments/African%20schoolnet%20toolkit.pdf>.



Something To Do

1. If your country has an e-government plan, review the plan using the checklist of critical success factors discussed in this section.
2. Discuss the institutional arrangement governing e-government policies and projects in your country.
3. Also, identify strengths and weaknesses of the institutional arrangement for e-government in your country.

1.5 Risk Factors in e-Government Deployment

It is widely believed that e-government implementation in many countries has failed to meet high expectations. Risks involved in e-government can be divided into citizen-side and government-side.

In general, citizen-side risks include:

- Digital divide
- Low expectations
- Lack of familiarity
- Not easy to use
- Lack of incentives
- Lack of trust
- Misconceptions

Government-side risks are:

- Complexity
- Department/agency-centric paradigm
- Lack of capacity
- Human resource constraints
- Financial resource constraints

Although the notion of failure varies, a 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.¹⁰ Factors leading to failure of e-government deployment in developing countries include:

- Lack of agreement within the government – Internal resistance
- 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

Deploying e-government can be risky and difficult, as it requires changes in behaviour. Thus, governments need to guide and supervise the e-government planning and implementation process, beyond the deployment of the technology and the set up and uploading of information and services online.

Governments have developed different strategies for e-government implementation depending on their capacities and their level of readiness. Accordingly, it is vital to recognize that no one solution fits every situation. Countries in Asia and the Pacific are characterized by vastly different political, economic, social and governance contexts, requiring different approaches adapted to each country's own situation.

¹⁰ National Information Society Agency, "Bridging Asia through e-Government", paper presented at the Asia e-Government Forum 2007, Seoul, Republic of Korea, 20 September 2007.



Something To Do

1. 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.
2. Discuss some of the most serious barriers preventing citizens from utilizing e-government services in your country.

2. IMPLEMENTATION OF E-GOVERNMENT

2.1 e-Government Maturity Models

As noted earlier, implementing e-government is a continuous process. The development of e-government is often conceptualized in stages. e-Government can be viewed as consisting of a set of phases not entirely sequential, but relying on growing levels of capability, knowledge and infrastructure. The most widely known maturity models have been developed by the United Nations¹¹ and the World Bank.¹² They see e-government as an evolutionary process, from which e-government initiatives should be derived and implemented. A global United Nations study to benchmark e-government identifies five stages for quantifying progress of e-government.¹³ The study identifies e-government stages as representative of the government's level of development based primarily on the content and deliverable services available through official websites.

1. **Emerging:** An official government online presence is established through a few independent official sites. Information is limited, basic and static.
2. **Enhanced:** Government sites increase; information becomes more dynamic. Content and information is updated with greater regularity.
3. **Interactive:** Users can download forms, e-mail officials, interact through the Web and make appointments and requests.
4. **Transactional:** Users can pay for services or conduct financial transactions online.
5. **Seamless:** Full integration of e-services across administrative boundaries. Total integration of e-functions and services across administrative and departmental boundaries.

To assist policymakers in devising their own plans and initiatives, the World Bank divides the process of e-government implementation into three phases. These phases are not dependent on each other. In other words, one phase does not necessarily need to be completed before another can begin.

1. **Publish:** Publish sites seek to disseminate information about government and information compiled by government to as wide an audience as possible. In doing so, publish sites serve as the leading edge of e-government.
2. **Interact:** Interactive e-government involves two-way communications, starting with basic functions like e-mail contact information for government officials or feedback forms that allow users to submit comments on legislative or policy proposals.
3. **Transact:** Allowing citizens to obtain government services or transact business with the government online. A transact website offers a direct link to government services, available at any time. Transact sites can enhance productivity in both the public and private sector by making processes that require government assistance or approval simpler, faster and cheaper.

11 United Nations Division for Public Economics and Public Administration and American Society for Public Administration, *Benchmarking E-government: A Global Perspective - Assessing the UN Member States* (2002), p. 2, <http://www.unpan.org/Portals/0/60yrhistory/documents/Publications/Benchmarking%20E-Government.2002.pdf>.

12 infoDev and Center for Democracy and Technology, *The e-Government Handbook for Developing Countries* (Washington D.C., 2002), <http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan007462.pdf>.

13 The five stages have been changed to four stages since 2008. See box 4.

2.2 e-Government Strategic Planning

A sound strategy is essential for effective e-government implementation. A strategic plan provides a road map for an organization to move from its current state to its desired medium- or long-term future state. e-Government strategic planning is a process of defining strategy for e-government, which consists of five steps.¹⁴ The example referred in this section is the e-Government Road Map of the Republic of Korea.

Step 1: Analyse the current environment

A SWOT analysis can be used to identify the internal and external factors that relate to e-government aims or goals. SWOT stands for **S**trengths, **W**eaknesses, **O**pportunities and **T**hreats.

To help decision makers identify priority areas for action based on their level of maturity and national development strategies, it is important to examine key dimensions of the e-government environment. The International Telecommunication Union (ITU) is in the process of developing an e-Government Implementation Toolkit. The e-Government Readiness Assessment Framework, serving as an introduction to the ITU Toolkit, “aims to assist decision makers from low, lower middle and upper middle income countries in determining the condition of e-government in their countries; comparing it to the status of e-government in other economies, and identifying priority areas for further action. To this end, the framework provides a comprehensive overview of publicly and freely available data, collected by United Nations agencies, international finance institutions, business organisations and non-governmental organisations (NGOs), which can be used to understand the e-government readiness of a country.”¹⁵ The framework includes an online “e-Government Readiness Quick-check Tool”¹⁶ that provides a graphical overview of a country’s readiness status based on the indicators selected for four dimensions of the e-government environment: infrastructure, policy, governance, and outreach. The Quick-check tool also allows users to display simultaneous graphs to compare one country’s scores to those of another.

Step 2: Articulate a vision statement

A vision statement articulates what a government wants to be in the area of e-government. In other words, it is a picture of e-government in the future for the country. A vision statement sets the direction for e-government strategic planning and serves to inspire members of the government towards reaching the future desired state of e-government.

For example, Singapore’s e-government vision is to be a collaborative government that co-creates and connects with people. And 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 programmes to 60 per cent.

14 Adegboyega Ojo, Elsa Estevez, Bernd Friedrich and Tomasz Janowski, “Strategic Planning for Electronic Governance”, paper 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>.

15 ITU, *e-Government Implementation Toolkit: Introduction – e-Government Readiness Assessment Framework* (Geneva, 2009), p. 1, <http://www.itu.int/ITU-D/cyb/app/docs/eGovernment%20toolkitFINAL.pdf>.

16 See http://www.itu.int/ITU-D/cyb/app/e-gov_checktool.html (the tool is also available in CD-ROM from ITU).

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

Step 3: Translate the vision into goals

Goals are long-term (three to five years) directions or targets based on the vision. The vision is translated into goals and they serve as an effective tool for making progress by ensuring what should be achieved.

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 designed to achieve a specific goal established in the e-government road map. For example, a strategy is a plan of action designed to implement 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.

An e-government strategy performs several functions. First, it communicates a shared vision of e-government across government agencies. Second, it provides a starting point for collaboration between ministries and departments on e-government efforts. Third, the strategy constitutes a reference for the government agencies to use when prioritizing and managing investments in ICT.

Step 5: Formulate concrete and measurable objectives from strategies

Objectives are the end results of a set of planned activities. 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 milestone 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 written plan or road map that needs to be communicated to everyone, and is regularly reviewed to ensure that it remains relevant. The e-Government Road Map of the Republic of Korea is an example.



The e-Government Road Map of the Republic of Korea

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

The road map is a five-year plan, covering the period 2003 to 2007. It specifies four areas, 31 tasks or projects grouped into 10 agenda as shown below.

4 Areas of Innovation	10 Agenda	31 Key Projects
1. Innovating the Way Government Works	1. Establishing Electronic Work Processes 2. Expanding the Administrative Information Sharing System 3. Service-oriented Business Process Reengineering	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 10. Expansion of Administrative Information Sharing System 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

4 Areas of Innovation	10 Agenda	31 Key Projects
	5. Enhancing Business Support Services 6. Enhancing Online Citizen Participation	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 25. Expansion of Online Citizen Participation
3. Innovating Information Resource Management	7. Consolidating and Standardizing Information Resources 8. Strengthening Information Security Systems 9. Strengthening Capacity of IT Personnel and Organizations	26. Government-wide Consolidated Information Resources Administration System 27. Enhancement of e-Government Communication Network 28. Establishment of Government-wide Information Technology Architecture 29. Establishment of Information Security System 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: NCA, 2004 *Broadband IT Korea: Informatization White Paper* (Seoul, 2004), p. 20.

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



Mongolia's e-Government Road Map

In 2005 the ICT Authority¹⁷ 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.

¹⁷ The ICT Authority was reorganized into ICTPA (Information, Communications, Technology and Post Authority) in 2008.

In addition, laws have been amended, as outlined in the e-Mongolia National Programme, to provide a favourable legal environment for ICT for development (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 Tax Agency's website from which various tax forms and documents can be downloaded.

Sources: ICT Authority, *Information and communications technology development in Mongolia – 2006: White paper* (Ulaanbaatar, 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*, Felix Librero and Patricia B. Arinto, eds. (New Delhi, Sage, IDRC, Orbicom, 2008), pp. 211-216, http://www.digital-review.org/uploads/files/pdf/2007-2008/2007_C16_mn_Mongolia_211_216.pdf.

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 road map or an ICT plan? Find out and describe the process through which the road map 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 road map 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 road map.

2.3 e-Government Implementation and Assessment

The successful implementation of e-government depends on the performance of each task or project in the e-government road map. There are various assessment models/frameworks related to e-government tasks and projects.

In the general context of ICT, the Capability Maturity Model (CMM) measures the maturity of an organization in terms of its use and application of ICT and information systems. It defines certain levels of maturity at which an organization can be at, and provides the criteria and characteristics of a typical organization at those levels. The model allows the evaluation and benchmarking of a public institution against best international practices in four capability areas of e-government:

1. Formulation of organizational strategies
2. ICT management
3. Operative management
4. Organizational capabilities including human resources¹⁸

Box 3. CMM and CMMI

- CMM is a reference model of matured practices in a specified discipline such as Systems Engineering CMM, Software CMM, People CMM and Software Acquisition CMM. But they were difficult to integrate as and when needed.
- CMM Integrated (CMMI) is the successor of the CMM and evolved as a more matured set of guidelines and was built combining the best components of individual disciplines of CMM (Software CMM, People CMM, etc.) It can be applied to product manufacturing, people management, software development, and so forth.
- CMM describes the software engineering alone whereas CMMI describes both software and system engineering. CMMI also incorporates integrated processes, product development and supplier sourcing.

Following the organizational assessment, it can be used to guide capability improvement. In this regard, the CMM is not only a diagnostic tool but also a generator of improvement road maps. It provides the government agencies with a methodological and technological tool to measure the current state ("As-Is"), define the desired state ("To-Be"), and measure the improvements over time to achieve that state.^{19,20}

In the realm of e-government, various assessment frameworks/models have been developed from different perspectives. Some of the existing assessment models include:

- The e-Government Assessment Framework (EAF), India
- The e-Government Economics Project (eGEP), European Union
- VAN-DAM model, Australia
- A Public Value Framework, United Kingdom (UK)

18 Mauricio Solar, et. al., "Identifying Weaknesses for Chilean e-Government Implementation in Public Agencies with Maturity Model", in *Electronic Government, 8th International Conference, EGOV 2009, Linz, Austria, August 31 - September 3, 2009, Proceedings*, Maria Wimmer, et. al., eds. (2009), pp.151-162, <http://www.informatik.uni-trier.de/~ley/db/conf/egov/egov2009.html>.

19 Marcelo Iribarren, et. al., "Capability Maturity Framework for e-Government: A Multi-dimensional Model and Assessing Tool", in *Electronic Government, 7th International Conference, EGOV 2008, Turin, Italy, August 31 - September 5, 2008, Proceedings*, Maria Wimmer, et. al., eds. (2008), pp.136-147, <http://www.informatik.uni-trier.de/~ley/db/conf/egov/egov2008.html>.

20 Mauricio Solar, et. al., "Identifying Weaknesses".

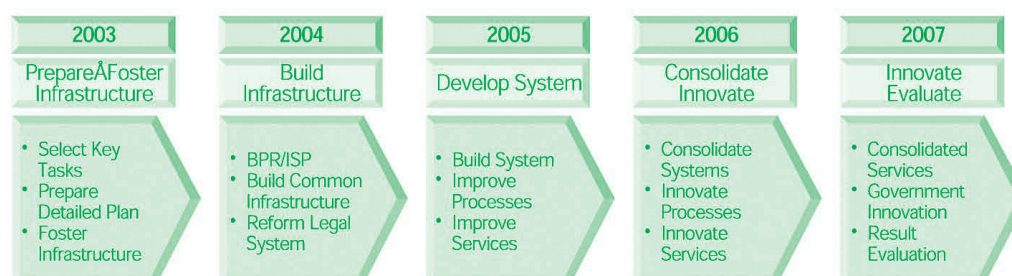
The EAF was developed by the Government of India to assess e-government projects. The EAF evaluates e-government projects using different attribute classes such as service-orientation (efficiency, user convenience, citizen centricity), technology (architecture, standards, security), cost-effectiveness, sustainability and replicability.

The eGEP is a European Union initiative that conducts research on new instruments for monitoring and evaluating the costs, benefits and outcomes of e-government. eGEP produced a general Measurement Framework for the analysis of socio-economic and governance impacts of e-government services. The Measurement Framework is built around three value drivers of efficiency, democracy and effectiveness, and elaborated in such a way as to produce a multi-dimensional assessment of the public value potentially generated by e-government, not limited to just the strictly quantitative financial impact, but also fully including more qualitative impacts.²¹ For details on the assessment models, please refer to the further reading section of this module.

In the case of the Republic of Korea, the Ministry of Government Administration and Home Affairs (MOGAHA)²² established guidelines for project management and announced the guidelines as a published ruling (No. 142, 30 March 2004). MOGAHA also designated the National Computerization Agency (NCA)²³ to manage the projects. Two flagship projects are designed to further promote e-government: the e-government support project and the administrative database construction project. The e-government support project is aimed at assisting cross-agency projects, new policy projects, or local informatization projects within the allocated budget and guidelines for each year.

The Korean e-Government Road Map projects are undertaken by stages as shown in figure 2.

Figure 2. Annual plan for the Republic of Korea's e-Government Road Map implementation



Source: NIA, *2006 Annual Report for e-Government* (Seoul, MOGAHA, 2006), p. 11, http://www.korea.go.kr/new_eng/html/files/publications/2006_EGov_Annual_Report.pdf.

From 2004 until June 2006 an estimated USD 516 million has been invested in 137 e-government promotional tasks, including 105 e-government road map sub-projects.²⁴

The United Nations Department of Economic and Social Affairs publishes a biannual comparative assessment on the development of e-government for 192 Member States. The *United Nations*

21 Cristiano Codagnone, Paolo Boccadelli and Maria Isabella Leone, "eGovernment Economics Project (eGEP): Measurement Framework Final Version", prepared for the European Commission, 15 May 2006, <http://www.epractice.eu/files/media/media1299.pdf>.

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

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

24 NIA, *2006 Annual Report for e-Government* (Seoul, MOGAHA, 2006), p. 11, http://www.korea.go.kr/new_eng/html/files/publications/2006_EGov_Annual_Report.pdf.

e-Government Survey serves as a tool for decision makers to identify their areas of strength and challenges. The Republic of Korea received the highest score, followed by the United States in the *United Nations e-Government Survey 2010*.²⁵ The comparative assessment is based on three areas: (1) Online Service Index, (2) Telecommunication Infrastructure Index, and (3) Human Capital Index.

The Online Service Index, which measures the online presence of government agencies (each country's national website as well as the websites in the ministries of education, labour, social services, health and finance), provides United Nations member States with a comparative ranking on their ability to deliver online services to their citizens.

Box 4. Four stages of online service development by the United Nations

Stage 1 – Emerging information services

Government websites provide information on public policy, governance, laws, regulations, relevant documentation and types of government services provided. They have links to ministries, departments, and other branches of government. Citizens are easily able to obtain information on what is new in the national government and ministries and can follow links to archived information.

Stage 2 – Enhanced information services

Government websites deliver enhanced one-way or simple two-way e-communication between government and citizen, such as downloadable forms for government services and applications. The sites have audio and video capabilities and are multi-lingual. Some limited e-services enable citizens to submit requests for non-electronic forms or personal information, which will be mailed to their house.

Stage 3 – Transactional services

Government websites engage in two-way communication with their citizens, including requesting and receiving inputs on government policies, programmes and regulations. Some form of electronic authentication of the citizen's identity is required to successfully complete the exchange. Government websites process non-financial transactions, for example: e-voting, downloading and uploading forms, filing taxes online or applying for certificates, licenses and permits. They also handle financial transactions, that is, where money is transferred on a secure network to government.

Stage 4 – Connected services

Government websites have changed the way governments communicate with their citizens. They are proactive in requesting information and opinions from the citizens using Web 2.0 and other interactive tools. e-Services and e-solutions cut across the departments and ministries in a seamless manner. Information, data and knowledge is transferred from government agencies through integrated applications. Governments have moved from a government-centric to a citizen-centric approach, where e-services are targeted to citizens through life cycle events and segmented groups to provide tailor-made services. Governments create an environment that empowers citizens to be more involved with government activities to have a voice in decision-making.

In addition, e-participation and citizen engagement are supported and encouraged by governments in the decision-making process. This is the most sophisticated level of online e-government. It is characterized by:

²⁵ United Nations Department of Economic and Social Affairs, *United Nations e-Government Survey 2010: Leveraging e-Government at a Time of Financial and Economic Crisis* (New York, 2010), http://www2.unpan.org/egovkb/documents/2010/E_Gov_2010_Complete.pdf.

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)

Sources: Adapted from United Nations Department of Economic and Social Affairs, *United Nations e-Government Survey 2010: Leveraging e-Government at a Time of Financial and Economic Crisis* (New York, 2010), p. 95, http://www2.unpan.org/egovkb/documents/2010/E_Gov_2010_Complete.pdf; and United Nations Department of Economic and Social Affairs, *United Nations e-Government Survey 2008: From e-Government to Connected Governance* (New York, 2008), <http://unpan1.un.org/intradoc/groups/public/documents/UN/UNPAN028607.pdf>.

The Telecommunication Infrastructure Index is a composite index of five primary indicators relating to a country's infrastructure capacity associated with the delivery of e-government services. The ITU is the primary source of data in each case.

The five indicators are:

1. Number of PCs per 100 persons
2. Number of Internet users per 100 persons
3. Number of telephone lines per 100 persons
4. Number of mobile cellular subscriptions per 100 persons
5. Number of fixed broadband subscribers per 100 persons

The Human Capital Index is a composite of two indicators: adult literacy rate and the combined primary, secondary, and tertiary gross enrolment ratio. A weight of approximately two-thirds is given to the adult literacy rate, and one-third to the gross enrolment ratio. The data for the adult literacy rate and the gross enrolment ratio are primarily from the United Nations Educational, Scientific and Cultural Organization (UNESCO), supplemented with data from the United Nations Development Programme (UNDP) Human Development Report.

2.4 e-Government Funding

Money makes things happen. For e-government initiatives, we have often seen a mismatch between planned and actual funding. e-Government projects usually incur large upfront expenditures. Treating e-government expenditures as normal operating expenditures may result in poorly financed projects. Under the current budget practices, as shown in figure 3, appropriations are made on an agency-by-agency and annual basis. On the contrary, the ICT budget is considered as a long-term capital investment rather than a short-term expenditure. Funding for e-government implementation may be obtained using various methods, such as foreign aid, special e-government fund, and public-private partnerships.²⁶

²⁶ For more information on options for funding ICTD and on public-private partnerships, refer to Module 8 of the *Academy of ICT Essentials for Government Leaders* module series.

Figure 3. 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



Something To Do

If your government has an e-government road map or plan:

1. Find out whether there is an implementation plan and analyse its strengths and weaknesses.
2. Discuss the necessary budget allocations for implementing the e-government road map or plan, and the sources of funding. Indicate whether you think the budget plan is adequate, and the reasons for your assessment.

2.5 Promising e-Government Strategy

Best practices of various countries suggest that there are three fundamental steps in developing e-government. The first is providing connectivity or establishing infrastructure, whereas the second is developing content and applications. The third is systems integration. System integration brings together subsystems onto one system, and ensures that the subsystems function together in one system.

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 4), connectivity means addressing the digital divide by providing public access to ICT 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 4. 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.²⁷

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).



In a remote village named Sasamunga in the island of Choiseul, approximately 1,000 miles 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 e-mail station operators and the operator at the Internet café in Honiara.

²⁷ 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>.

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 the governments of Australia, China, Japan, New Zealand and the UK, as well as the European Union. Now self-sustaining, PFnet is managed by the Rural Development Volunteer Association, an 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>.

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).²⁸



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 more than 500 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.

Grameen Phone has also developed an e-Krishok tool for the CIC. e-Krishok is a Web-based tool from where farmers can obtain specific information on the soil, climate and fertilizer requirements for land of a specific area. This tool helps to keep the farmers updated with modern agricultural technology, which in turn helps to increase agricultural production.

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.

²⁸ 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.

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 under-employed.

The ILCs, launched in 2005, are a programme of Relief International School Online. Each ILC is equipped with 5 to 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.

Sources: 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.

Md. Anwarul Islam and Kazi Mostak Gausul Hoq, "Community Internet Access in Rural Areas: A study on Community Information Centres in Bangladesh", *Malaysian Journal of Library & Information Science*, Vol. 15, No. 2 (August 2010), pp. 109-124.



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?

3. TYPES OF E-GOVERNMENT APPLICATIONS: SOME EXAMPLES

3.1 Classification of e-Government Applications

Many government organizations have embraced the digital revolution and are putting a wide range of public information and government services online for intended e-government users or stakeholders. They 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”?

Fang²⁹ identified eight models of e-government according to type of interaction between stakeholders (see table 3).

Table 3. e-Government classification by interaction between stakeholders

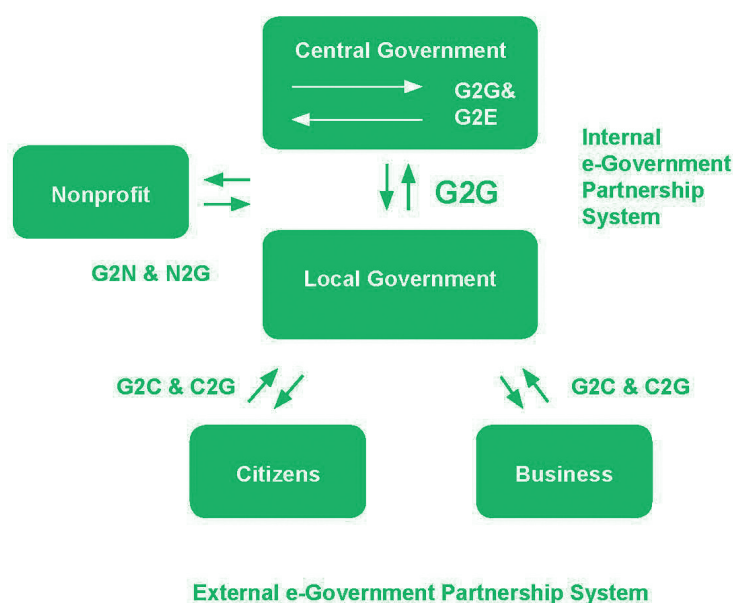
e-Government Models	Interaction between Stakeholders
Government-to-Citizen (G2C)	One-way delivery of public services and information by the government to citizens.
Citizen-to-Government (C2G)	Allows for exchange of information and communication between citizens and government.
Government-to-Business (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.

29 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), pp. 1-22, <http://www.journal.au.edu/ijcim/2002/may02/article1.pdf>.

e-Government Models	Interaction between Stakeholders
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. 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 may be involved in two types of partnerships: internal partnerships and external partnerships (see figure 5). Internal partnerships are cooperative alliance within and between the government agencies. External partnerships refer to the relationship between government, citizens and businesses.

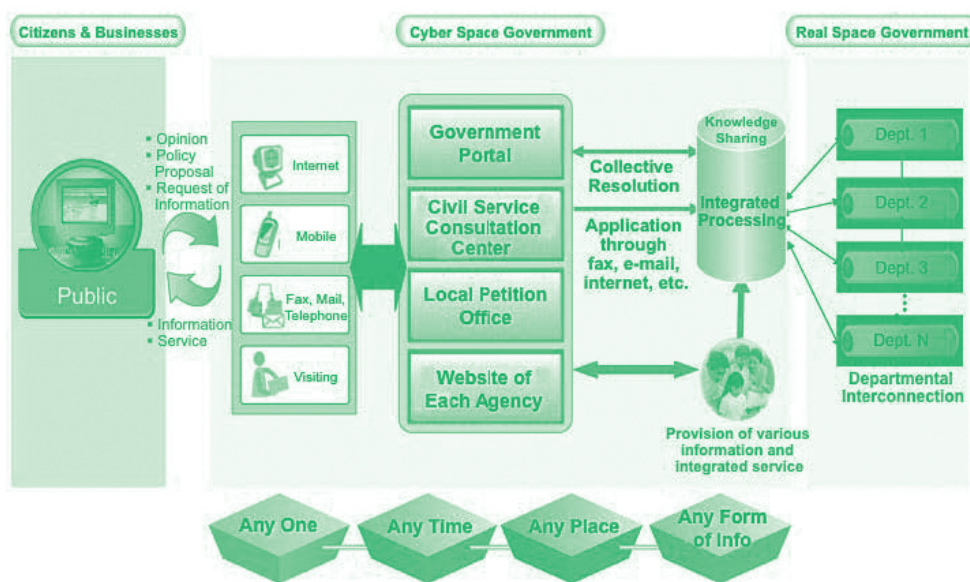
Figure 5. e-Government partnership systems



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), pp. 1-22, <http://www.journal.au.edu/ijcim/2002/may02/article1.pdf>.

As mentioned in the previous section, three areas of e-government 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 the Republic of 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 Korea³⁰



Source: Soh Bong Yu, "e-Government of Korea: How we have been working with it", KADO presentation, p. 5.



Something To Do

1. e-Government has sometimes been seen as benefiting only the middle and upper classes in developing countries. Do you agree or disagree?
2. If you agree, what are the steps towards building an e-government application that is inclusive of the entire population?
3. Explain priority areas for e-government implementation as seen by stakeholders (citizen, business, foreign investor, government employee, non-profit organization).

³⁰ When a new administration took office in February 2008, the Government of the Republic of Korea underwent an institutional reform. The Ministry of Government Administration and Home Affairs (MOGAHA) was renamed the Ministry of Public Administration and Security (MOPAS), and assumes affairs related to national administration, government organizations, personnel management, e-government and disaster safety. MOPAS also took up the informatization strategy function of the former Ministry of Information and Communication (MIC). In February 2008, the Korea Communications Commission (KCC) was newly established under the office of the President, and embraced the core functions of the former MIC and Korean Broadcasting Commission, serving as an integrated organization responsible for both policymaking and regulation. The National Computerization Agency (NCA) was renamed the National Information Society Agency (NIA) in October 2006, and the Korea Agency for Digital Opportunity and Promotion (KADO) was merged into NIA in May 2009. In July 2009, the Korea Information Security Agency, National Internet Development Agency and Korean IT International Cooperation Agency came together to form the Korea Internet and Security Agency (KISA) as one of the government agencies under the KCC.

3.2 Government-to-Citizen (G2C) Applications

One important aspect of citizen-centric orientation in e-government is making it easy for citizens to find what they are looking for, whether information or services, in numerous government websites. In this regard, government portals offer single points of access to the multiple agencies, and give citizens the opportunity to interact easily and seamlessly with different parts of the government. Instead of focusing on what agencies intend to deliver, portals present information and service in a unified way. A one-stop government portal, coupled with significant re-engineering of the back end that facilitates information sharing across agencies, is a very useful service channel. In addition, the portal is a very important means of communication between government, citizens and businesses.

Online Citizen Service (G2C Portal, Minwon 24)

There are many examples of G2C portals redesigning the service delivery processes of governments. Although individual agency or ministry websites are still important, it has now been generally accepted that G2C portals are becoming the preferred online format for governments to present their information and service offerings to citizens.

Box 5. Guidelines for implementing e-government portals

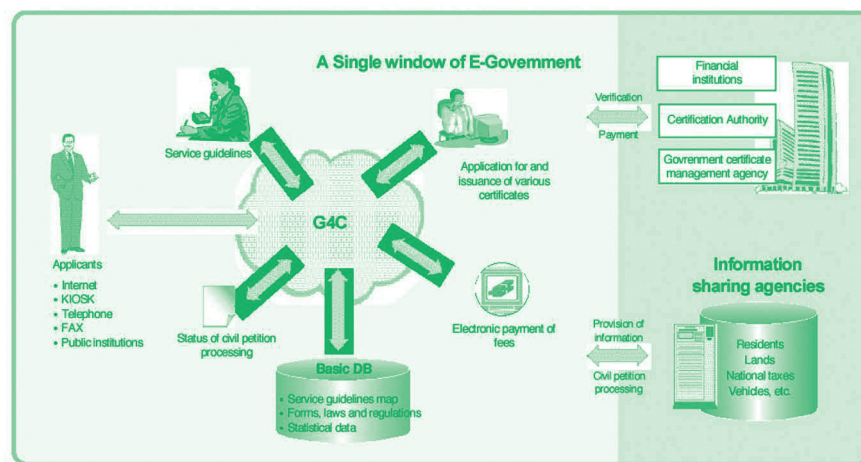
- **Provide Citizen-Centric Service:** The core concept for portal development should be the provision of citizen-centric service—citizens should be able to access services as quickly and efficiently as possible, anywhere and anytime, with services organized in a manner that facilitates their access, and with a citizen’s point of view.
- **Offer Compelling Services:** It is important to offer high priority services, for which there is a strong citizen demand.
- **Adopt a Whole-of-Government View:** Truly citizen-centric service delivery requires a movement away from individual government applications in individual departments. Systems can no longer be developed independent of each other—a “whole-of-government” view needs to be adopted.
- **Develop a Unified Information Architecture:** Having an architectural blueprint to guide systems integration at the back end is extremely important. Funding and systems selection should be based on this architecture, the foundation of which is Web enablement of services and systems.
- **Adopt a Citizen Perspective to Portal Design:** Information in a government portal needs to be well organized to facilitate navigation. Online services should, therefore, be designed based on what the citizen needs, and how best to facilitate their access, for example, to have services organized by topic (health, education, etc.) or major life events (birth, marriage, and death, etc.) as opposed to the traditional method via departmental listings.
- **Set Clear Performance Targets:** Clear annual targets should be set to evaluate progress. Success factors should be defined at the very outset, otherwise, users may end up using only a small subset of services.

- **Offer a Multiplicity of Service Channels:** Transactional services need to be provided through regular channels, such as physical and telephone, in addition to e-channels. The technical architecture of the e-channels must reflect the reality that services will be provided through these other means.

Source: Adapted from The World Bank, Implementing E-Government Portals, <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTGOVERNMENT/0,,print:Y~isCURL:Y~contentMDK:20870039~pagePK:210058~piPK:210062~theSitePK:702586~isCURL:Y,00.html>.

In the Republic of Korea, the inefficiency in government service delivery was caused by the development of separate national databases, such as those for residents, lands, vehicles and taxes. Due to the existence of major databases in silos, citizens were required to keep filling out the same information over and over, and go through a lot of paperwork for certificate application with multiple visits to government agencies. To improve the convenience and efficiency, a system for interconnecting major national databases capable of reciprocal operation between government agencies and an official government portal for civil services were developed. Minwon 24 is the gateway to online civil services, and provides a single window through which citizens and businesses can access various government services using multiple channels (see figure7).

Figure 7. Single-window e-government



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 39, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf>.

This portal provides a wide variety of services, including issuance of various certificates, electronic payment, and dissemination of government information. A multi-channel approach is necessary to ensure maximum participation of citizens and businesses, and since different groups are likely to have different preferences and capabilities 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.³¹

The different one-stop delivery channels deployed to increase access to e-government services include the following:

³¹ For more information about various types of multi-channel one-stop single access to government services, refer to: The World Bank, "e-Government for All" (see footnote 6).

- One-Stop Citizen Service Centres – Where single-window service delivery is implemented by several agencies, 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 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 short messaging service (SMS) and specially designed m-government portals. Examples may be found in India, Singapore, 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.³²

In the case of the Republic of Korea, the movement towards a citizen-centric, multi-channel, single-window government initially started with the construction of the official Korean government website and Home Citizen Service Centre in 1997 to provide the public with administrative information and service request forms in a systematic way. By 1999, 20 types of citizen services had become available via the Home Citizen Service Centre. In 2000, the Centre was integrated with the in-house administration system so that citizens could send requests from their PCs 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 government information and to use one-stop online civil services regardless of time and place. By April 2002, the first and second phases of the G2C project were completed. ISP for enhanced online citizen services was implemented in 2003 to lay the groundwork for a standard G2C system. Now Korean citizens can make a request for certificate and print it out from their own printer at home through G2C online civil services anytime anywhere, without having to visit any government offices. By the end of 2010, the number of services on offer had expanded dramatically to approximately 5,300 kinds of guidelines for civil service, 720 kinds of civil applications and 28 kinds of online issuances. Furthermore, aggressive efforts to promote the utilization of the online civil services by linking to private portals such as NAVER³³ and others have resulted in remarkable increases in the use of the service: from less than 52,000 online applications in 2002 when the service was launched, to 31,288,000 online application in 2010 (see figure 8). Minwon 24 received the United Nations Public Service Award in 2011.

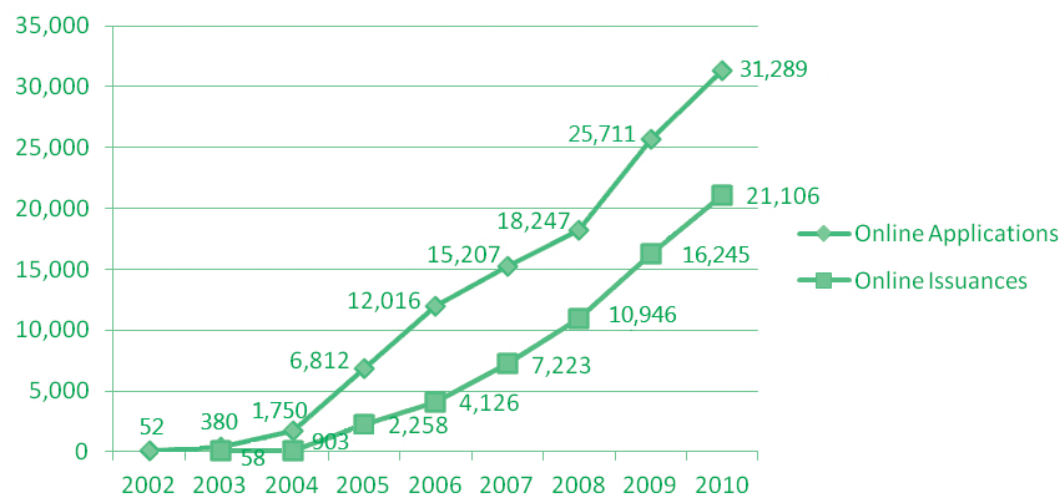
Advanced e-government in the Republic of Korea was strongly established with the building of a Web-based citizen service system interconnecting five major national databases, including resident, land, vehicle, tax and insurance. The new citizen service system has improved the quality of people's lives and administrative efficiency by providing services with fewer to no document requirements and personal visits to government offices. Supposing an average of 30 per cent of total citizen services is conducted online for five years, savings of KRW 1.8 trillion (about USD 1.8 billion) is expected.

³² Ibid.

³³ NAVER (<http://www.naver.com>), operated by NHN corporation, is a popular Internet portal site in the Republic of Korea.

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

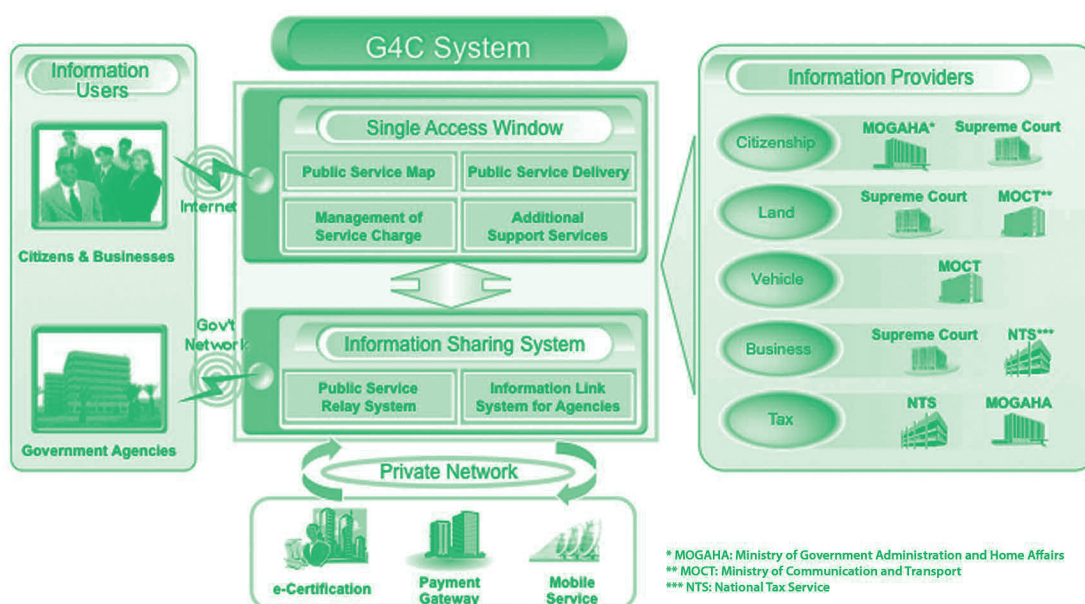
(Unit: thousand cases)



Source: e-National Indicators, http://www.index.go.kr/egams/stts/jsp/potal/stts/PO_STTS_idxSearch.jsp?idx_cd=1026&stts_cd=102601&clas_div=C&idx_sys_cd=&idx_clas_cd=1.

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 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, p. 19.

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



Government Administration Information System 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 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 (PAIS), has been completed to extend this model to 10 provinces with more than 160 organizations nationwide, rolling out the applications and providing e-mail, Internet access and Voice over Internet Protocol (VoIP) services to all connected organizations.

Sources: Leewood Phu, *Cambodia: The road to E-governance of Cambodia: A Comprehensive Analysis of E-government Project* (Seoul, United Nations Project Office on Governance, 2011).

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), pp. 124-127, <http://www.digital-review.org/uploads/files/pdf/2005-2006/start.pdf>.

Integrated Tax System³⁴

The consolidated online tax system in the Republic of Korea enables taxpayers to conduct all tax-related transactions without visiting tax offices. In the past the National Tax Service (NTS) sent tax bills via mail and taxpayers visited the NTS in person to complete tax-related businesses. Now, taxpayers either paid their taxes through the designated banks or utilized other national tax payment options, including via Internet banking.

The integrated tax system aimed to increase tax revenue, prevent corruption in taxation, increase voluntary compliance by taxpayers, establish advanced tax administration, and ensure fast and accurate public service. The online tax system covers income tax, corporate tax, value-added tax, property tax and other taxes. From 1999 to 2000, the Electronic Tax Return Filing System was developed as a pilot project with tax accountants of the Seoul office of the NTS, including 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 cases of withholding tax return and 10 per cent of 2.12 million cases of value-added tax return were filed electronically in 2001. The Electronic Tax Return Filing System was expanded further to include the securities transaction tax and stamp tax. In addition, an electronic tax payment system was developed for immediate payment of taxes that are notified or filed electronically. In addition, individuals and businesses can make a request or inquiry for certificates of business registration, tax payment, temporary suspension or closing of business online.

By eliminating redundant data input and speeding up tax-related business processes, the integrated tax system improves operational efficiency and reduces costs. For example, annual savings of up to KRW 146 billion (about USD 146 million) are expected from the elimination of written notices via mail and delays in mail delivery. Taxpayers can save up to KRW 300 billion (about USD 300 million) annually in labour cost and transportation expenses associated with 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 Social Insurance System³⁵

In 2001, ISP for the construction of an interconnected social insurance information system was undertaken as one of the main pillars of e-government. Prior to the interconnected system, the public corporations responsible for the four social insurance programmes operated individual information system respectively even though they had much in common in terms of administering eligibility and delivering benefits. With an interconnected information system, information on the defined population for the four major social insurance programmes, including the national pension, health insurance, industrial accident compensation insurance and unemployment insurance are shared as needed and thus common tasks, such as claims and changes in coverage, are easily dealt with.

Although each public corporation maintains its own portal, information collected from participants as well as from NTS and MOGAHA is shared by the four public corporations. More than 20 organizations (besides businesses, hospitals, city and provincial offices) are interconnected through the system. The homepage of each corporation serves as an online information centre through which inquiries, civil petitions, notices, and insurance payments are processed.

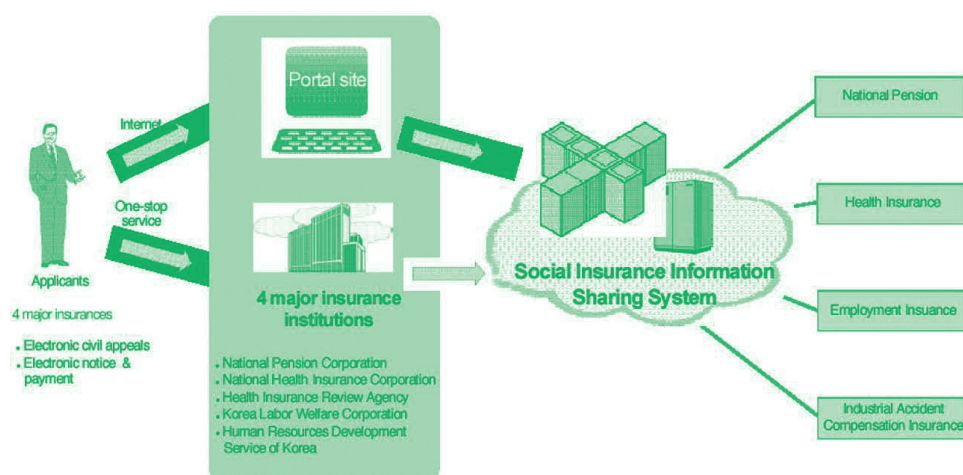
With information sharing among the social insurance public corporations via the interconnected system, the number of required documents, processing time and cost have all been dramatically

³⁴ This section is drawn from NCA, *e-Government in Korea* (Seoul, 2002), <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf>.

³⁵ Ibid.

reduced, resulting in annual savings of KRW 542.3 billion (about USD 542.3 million). The system is also making it easy for the government to identify citizens who are not covered by the existing social insurance services.

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



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 43, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf>.

Resident Registration (National Identity Card) Applications³⁶

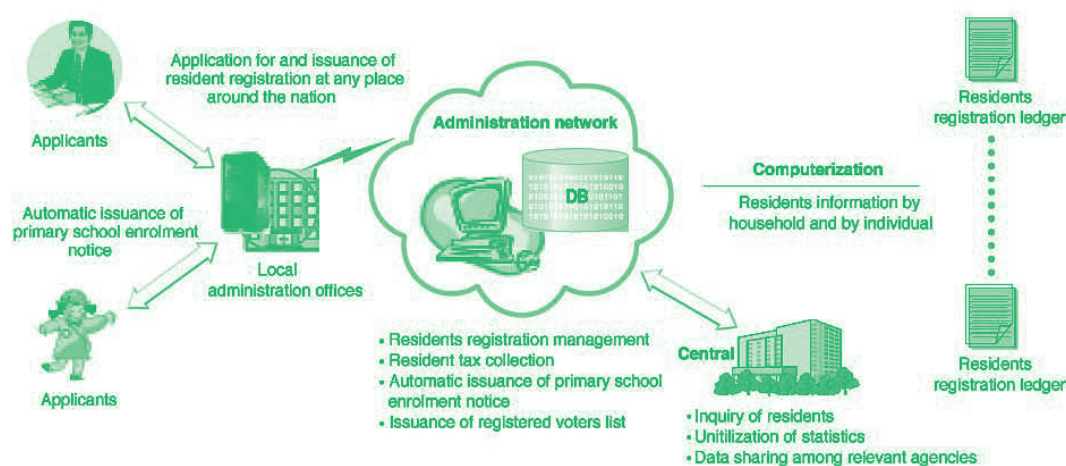
Resident registration management was conducted by manual recording of resident's information on registers and also manual tracking of changes. This process had been slow, inaccurate and inefficient. Besides, restoration of information was difficult once registers were damaged or lost. And a change of address took more than three days.

In the Republic of Korea, the resident registration management system project started two decades ago with the integration of six resident registration-related registers for each citizen into a single register. This was followed by the construction of a nationwide resident information database. For a period of two years (1989-1990), civil servants in 3,678 Eup/Myun/Dong (village or town level administrative unit) across the nation manually keyed in data from approximately 5.7 million registers. In 1998, the Resident Registration Cards Issuance Center was set up and issued new ID cards by utilizing the resident registration system. The system provides the following major services: resident registration management, residence tax collection, notification of primary school attendance and lists of registered voters.

In 2001, an information sharing system for resident registration was developed and has been in use since then. The information sharing system for resident registration is accessible online to the authorized agencies that need the information for various government functions and services. For citizens, the resident information system and information sharing system enable anyone living in one district to apply for a certified copy of his/her resident registration in other district offices, and also enable change of address to be automatically forwarded to national pension records, health insurance records, vehicle registration records and driving license records.

36 Ibid.

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



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 15, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023905.pdf>.

Real Estate Information Management System³⁷

Government activities in relation to real estate include developing residential area, housing plans, land utilization plans, collecting real estate taxes, and regulating real estate speculation. These activities require comprehensive and efficient management of real estate information, which is made possible by the use of ICTs.

As early as 1982, land and forest land registration ledgers were stored in computer systems, resulting in a real estate database of 32 million parcels across the nation. Local district offices were subsequently connected to the Central Real Estate Network to update changes in real estate information. This system, which took six years (1985-1990), improved the accuracy and speed of services. Soon thereafter, in February 1991, online service was launched, including the online issuance of registration certificates.

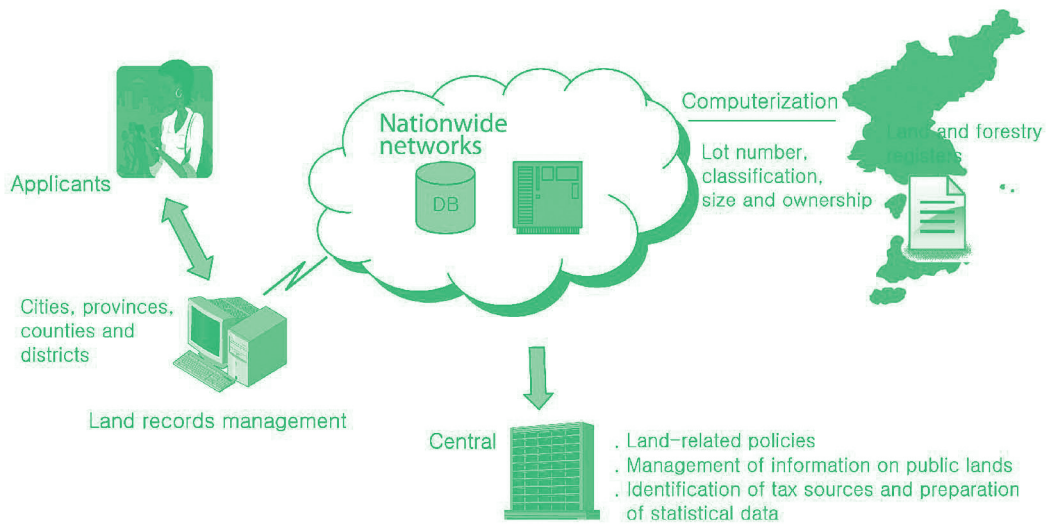
Following the establishment of the National Land Information Centre in 1997, the Real Estate Real Name Registration System was introduced to regulate real estate speculation. Since 1998, the real estate system has been consolidated into the Local e-Government System as one of the 21 key tasks. Also, by interconnecting the real estate system and building management systems as well as other relevant systems, a full-fledged one-stop service started in 2002.

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

- Streamlining of process from 10 steps to 3 steps
- Containment of a 15 per cent increase in human resources for land-related administration
- Improvement of the quality of services
- Online accessibility of land and forestland ledgers to citizens for perusal and issuance
- Reduction in lead time for issuing a certificate from 30 minutes to 5 minutes
- Greater transparency in real estate transactions

³⁷ Ibid.

Figure 12. Conceptual diagram for the Republic of Korea's real estate management system



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 17, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023905.pdf>.

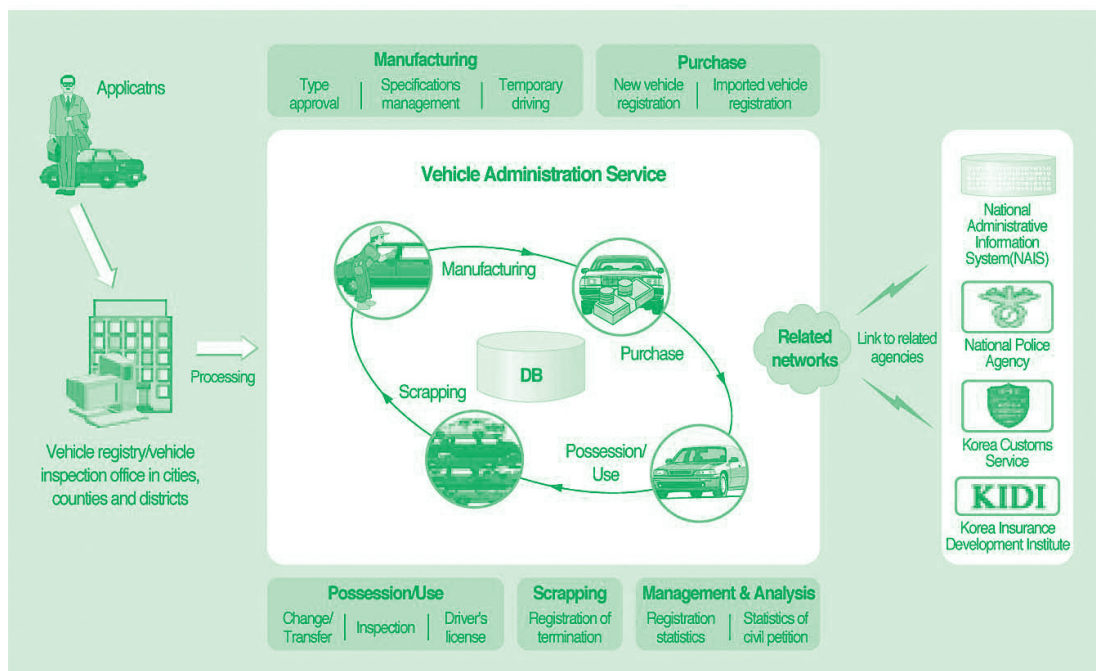
Vehicle Administration³⁸

A vehicle information management system provides an effective tool for the management of various types of vehicles in the face of ever increasing number of vehicles. In the Republic of Korea, it took a decade for the current integrated vehicle administration system to evolve. The system began operations focusing on vehicle registration and inspection in 1991, which did not bring about sufficient improvement of efficiency due to the lack of advanced features such as vehicle specifications, temporary driving permission, and driver's license management. In 1998, a more comprehensive vehicle administration system was developed, which included the whole range of vehicle administration tasks from registration to scrappage. A subsystem for two-wheeled vehicles and construction machinery was added in 1999, followed by a common platform enabling various agencies to collect and share vehicle-related information in 2001.

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

38 Ibid.

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



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 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 from the citizens' perspective in your country? 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.

3.3 Government-to-Business (G2B): Innovating business services

G2B includes interactions and transactions between government and businesses, that is, governments' selling to businesses and providing them with information and services, and businesses' selling products and services to governments. Other services conducted between government and businesses such as application forms, and renewal of licences and permits, registering companies, obtaining permits, and payment of taxes and fines are also clustered into G2B.

Integrated e-Procurement System

The Republic of Korea joined the World Trade Organization Government Procurement Agreement in 1994. This shed light on various problems associated with the manual procurement system, such as inefficiency caused by redundant manual processes and corruption due to intensive personal contacts.³⁹ Thus, the government decided to establish an advanced digital procurement system that would ensure timely delivery, quality products, and reasonable prices based on accurate procurement information, eventually building a transparent and efficient procurement platform for all participants.⁴⁰

Figure 14. Single-window government procurement system



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 41, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf>.

The digital system is called the e-Procurement System of the Public Procurement Service of Korea (KONEPS). This is an online system that enables fast and convenient processing of all public procurement-related tasks, including bidding, contracting, payment and product delivery. Procurement information, including receipt of purchase requests, public announcement of biddings, award of contracts and contract status is provided online with ensured fairness and transparency for all transactions. e-Procurement was conducted by 42,400 public entities and 195,000 companies in 2010.⁴¹

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

39 Korea Herald, "eGovernment: Saving time and spending less with e-services", 17 March 2007.

40 NCA, *e-Government in Korea* (Seoul, 2002), <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf>.

41 Public Procurement Service, KONEPS, April, 2011.



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 procurement
- 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 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 the initial eight departments that utilized the system and performed 990 tenders in 2003-2004, the e-Procurement platform opened to 32,329 tenders in 2008-2009. It helps both the buyers and suppliers to reduce the cycle time, unnecessary paperwork, waiting in long lines, and simultaneously maintain the transparency in the entire process. 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.

The Mauritius government signed a Memorandum of Understanding with the Andhra Pradesh government on August 2009 to use the GoAP's e-procurement model for its projects. The GoAP's procurement platform was used to implement irrigation, infrastructure and various other projects taken up by 26 departments, 39 public sector undertaking corporations and 127 civic bodies.

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 made in 2007, <http://himachalnit.nic.in/Casestudy-APeProcurement.pdf>.

K. Bikshapathi, P. Rama Raju and Subhash Bhatnagar, "E-Procurement in Government of Andhra Pradesh, India", The World Bank e-Government Case Studies, 30 March 2006, <http://go.worldbank.org/XJS8XWB030>.

Customs Applications System

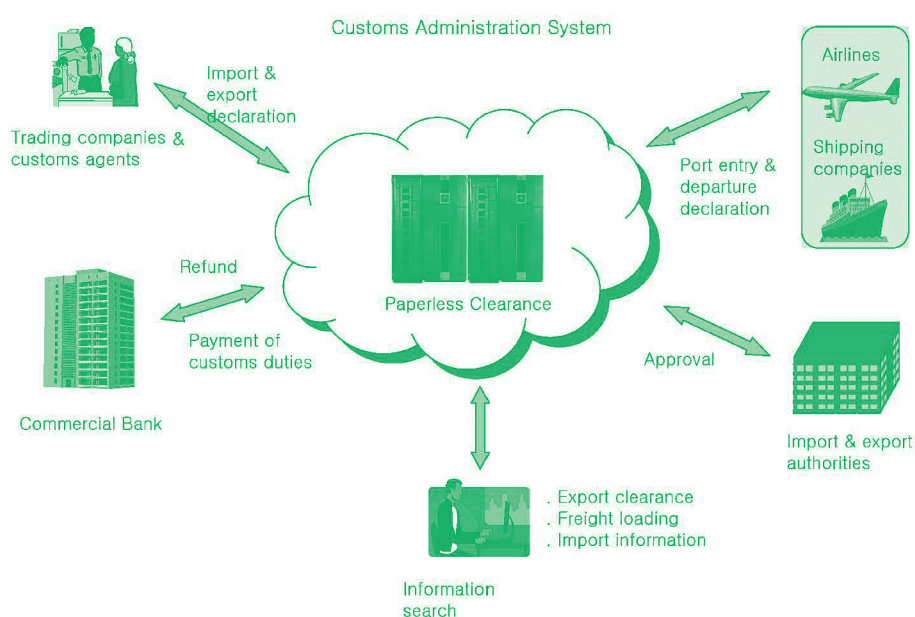
Prior to the establishment of an e-customs system in the Republic of Korea, importers and exporters needed to appear in customs offices and financial institutions to clear their goods, pay customs duty and apply for tax refunds. Clearance, surveillance and control over airports and sea ports were not systematically performed, causing complaints and inconveniences.

The objectives of building an e-customs system were to: (1) establish information systems that streamline customs administration; (2) detect smuggling; (3) reduce logistics costs in the import and export industries; and (4) improve the quality of customs services.

The e-customs system of the Republic of Korea is a one-stop single window for international trade. Customs clearance procedures such as import/export declarations, 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 2.5 hours. This is one of the fastest customs clearance systems among 175 member States of the World Customs Organization. Complicated import clearances that used to span two full days are now completed in only 2.5 hours—an astounding four hours faster than the recommendation of the United Nations Conference on Trade and Development (UNCTAD).⁴²

In 2005, the NIA released a report on the Republic of Korea Customs Service informatization progress evaluation.⁴³ The report found that e-customs greatly enhanced efficiency in export/import clearance and various other declaration businesses, creating KRW 709.9 billion worth of economic value for the Republic of Korea Customs; KRW 2.37 trillion worth of more industrial value regarding production opportunity, cargo traceability, and effective facility operation; and value equal to KRW 798.2 billion for inter-industry relation effect. All of these amount to economic value of KRW 2.8 trillion each year.

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



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 29, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023904.pdf>.

42 Korea Customs Service, e-Customs, <http://www.korea.go.kr/html/files/intro/008.pdf>.

43 NIA, *Measuring the Performance of e-Customs Service*, 2005.

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



Customs Reform in the Philippines

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,⁴⁴ 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 various types of import transactions, 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

In October 2004, the pilot testing of a new clearance system utilizing the GXS' RosettaNetCustoms 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 Philippines electronic industry by enabling more secure and automated transactions with their foreign suppliers.

In 2005, E2M (electronic-to-mobile) customs project, supported by the Presidential e-Government Fund, was launched. It seeks to streamline BOC's core processes (import and export) and improve trade facilitation between the Bureau and its stakeholders including other government agencies through the development and integration of various Web and SMS systems, thus leading to less face-to-face interactions.

44 Automated System for Customs Data.

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), pp. 113-134, http://www.afact.org/2012/wordpress/?page_id=67.

Businesswire, "Philippines Bureau of Customs Deploys GXs' RosettaNetCustoms Solution; Faster Clearance and Reduced Cost Benefits Targeted at Philippines Semiconductor and Electronics Industries", 25 August 2005, http://findarticles.com/p/articles/mi_m0EIN/is_2005_August_25/ai_n14930696.

Department of Finance, Bureau of Customs, <http://www.customs.gov.ph>.

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

Subhash Bhatnagar, "Philippine Customs Reform (The World Bank e-Government Case Studies, 3 January 2001), <http://go.worldbank.org/J8J2YV6KG0>.



Questions To Think About

1. What do you think are the issues and challenges in adopting and operating an e-customs system?
2. How can the different interests of various stakeholders be aligned for an e-customs system?

e-Commerce Applications⁴⁵

e-Commerce primarily refers to buying and selling of products or services over the Internet and other computer networks. However, it is often more than just buying and selling products online. It also includes the entire online process of developing, marketing, delivering, and paying for products and services. 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 ICTs.

Box 6. Legal issues relating to e-commerce

Legislation on e-commerce is a necessary step to ensure that online transactions are legally binding. Online transactions pose a number of challenges to the formation and enforcement of contract. 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.

⁴⁵ This section is drawn from Ministry of Information and Communication, *e-Korea Vision 2006: The Third Master Plan for Informatization Promotion (2002-2006)* (Seoul, 2002), http://www.ipc.go.kr/ipceng/policy/vision_2006.jsp.

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 legislative 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.

Source: UNCITRAL, *United Nations Convention on the Use of Electronic Communications in International Contracts* (New York, United Nations, 2007), http://www.uncitral.org/pdf/english/texts/electcom/06-57452_Ebook.pdf.

One of the key features of e-commerce is the establishment of business-to-business (B2B) transactions to promote small and medium enterprises (SMEs). The government needs to build the basic infrastructure that is necessary to promote e-commerce for small businesses, such as wireless telecommunications networks utilizing ultra high frequency, and strengthen existing infrastructure such as mobile telecommunications networks, satellites, and broadcasting networks. In B2B e-commerce, the 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. Given the tendency for closed and non-transparent corporate culture, the government needs 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 a geographic information system, and through linkages with wireless telecommunications 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, 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 is planned to handle all processes associated with international trade, including intermediation, contracts, payments and logistics. 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 to connect all companies in the Republic of Korea to the Internet and expand 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 has been implemented, as well as the provision of services in concentrated industrial complexes.

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



e-Commerce in the Republic of Korea

With more than 94 per cent of Korean households having access to the Internet, the Republic of Korea is one of the top countries for Internet usage and broadband penetration. As the Republic of Korea's high-speed infrastructure continues to grow, along with government initiatives to promote digital convergence, demand for e-commerce transactions is increasing. Statistics show that Korean e-commerce transactions in 2008 was valued at USD 524 billion, which was a 17 per cent increase from the USD 423 billion reported in 2007. The demand for new convergence services, such as wireless Internet, Interactive and 3D Internet Protocol TV 2.0 (IPTV), Digital Multimedia Broadcasting, Radio Frequency Identification, cloud computing and home networking services, are anticipated to experience continued growth and increase e-commerce transactions over the next few years.

e-Commerce transactions in the Republic of Korea are generally categorized as B2B, business-to-consumer (B2C) and consumer-to-consumer (C2C). In 2008, the total volume of transaction for the Republic of Korea's B2B market, including B2G, reached USD 492 billion, an 18 per cent increase from 2007. B2B and B2G accounted for nearly 90 per cent

of the Republic of Korea's total e-commerce transactions and are forecasted to grow at an average annual rate of 20 per cent. According to the statistics, manufacturing companies in the Republic of Korea make up 60 per cent of the entire B2B activities for which the total amount of transactions was worth USD 288.7 billion in 2008.

As the Internet business adopts Web 2.0 applications and provide a more open environment where users and potential customers can interactively participate, many Korean e-commerce firms have changed their strategies and offered user-friendly/centric services. They have created more content for advertisement, education, games and shopping, utilizing User Created Contents and power-blogging websites, and successfully generating more revenues. e-Commerce revenues of the Republic of Korea's top e-business companies, including major portals, comprise approximately 60 to 70 per cent of the total revenue and are expected to continue to grow over the next several years. According to the National IT Industry Promotion Agency, the total volume of transactions is expected to reach USD 776 billion in 2013.

The *2006 Status Survey on Domestic e-Business* by the Korea Institute for Electronic Commerce on 4,000 companies shows that 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.

Source: Chris Anh, "Korea's e-Commerce Industry", US Commercial Service South Korea, 16 December 2009, <http://www.globaltrade.net/international-trade-import-exports/f/market-research/text/South-Korea/Retail-Trade-Electronic-Commerce-Korea-s-E-Commerce-Industry.html>.

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.
- 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, many 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.

In 2011, Thailand's e-commerce industry continues to grow at a rapid rate with significant changes noted in the behaviour of Thai users. Statistics from Thailand's National Electronics and Computer Technology Center (NECTEC) show that the percentage of Thai users shopping online has risen from 47.8 per cent in 2010 to 57.2 per cent in 2011. The factors driving the increase in Thailand include: online payment system development, ease of creation of e-commerce websites, promotion by e-commerce shops and group buying trends. According to the Thai Internet User Survey in 2010, books are the most popular products Thai users order from the Internet, representing 34.7 per cent of online sales, followed by making reservations online at 31.3 per cent, and 26.7 per cent for buying clothes.

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: National Information Technology Committee Secretariat, *Information Technology Policy Framework 2001-2010: Thailand Vision Towards a Knowledge-Based Economy* (Bangkok, NECTEC, National Science and Technology Development Agency, Ministry of Science and Technology, 2003), http://www.nectec.or.th/pld/documents_pris/IT2010eng.pdf.

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

Somnuk Keretho and Paisan Limstit, *e-Commerce: The Way of Business in Thailand* (Bangkok, NECTEC, 2002), <http://unpan1.un.org/intradoc/groups/public/documents/unpan/unpan033416.pdf>.

Sze Kultarika, "Thailand E-Commerce Trends in 2011", 22 June 2011, <http://www.searchblog.asia/thailand-e-commerce-trends-in-2011>.

Thaweesak Koanantakool and Kalaya Udomvitid, ".th Thailand", in *Digital Review of Asia Pacific 2007/2008*, Felix Librero and Patricia B. Arinto, eds. (New Delhi, Sage, IDRC, Orbicom, 2007), pp. 313-320, http://www.digital-review.org/uploads/files/pdf/2007-2008/2007_C29_th_Thailand_313_320.pdf.

The Economist Intelligence Unit, "Thailand: Overview of e-commerce", *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.



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.

3.4 Government-to-Government (G2G): Innovating the way government works

Government-to-government (G2G) interactions involve sharing data and conducting electronic reciprocal activities within and between government agencies. The main motivating force behind G2G lies in the growing attention being paid to improve government efficiency by saving transaction costs and streamlining back offices, increasing the speed of transactions, reducing the number of personnel necessary to complete a task, and improving the consistency of outcomes.

Integrated Finance System⁴⁶

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.

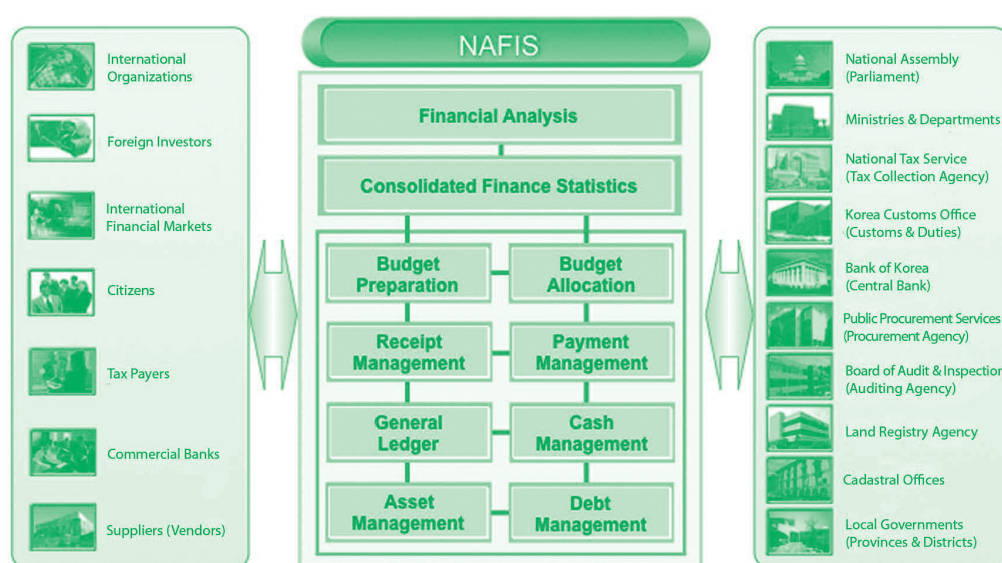
From the mid-1970s to 1985 local banks in the Republic of Korea introduced computer systems to business units and established networks interconnecting headquarters and branches. In the early 1980s, as part of the National Basic Information System Project, the inter-bank financial information system was deployed, enabling customers to conduct inter-bank financial transactions. The inter-bank financial information system was upgraded from 1992 to 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 in 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.

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 National Financial Management System (NAFIS). As shown in figure 16, NAFIS consists of 10 modules:

⁴⁶ This section is drawn from NCA, *e-Government in Korea* (Seoul, 2002), <http://unpan1.un.org/intrdoc/groups/public/documents/APCITY/UNPAN023905.pdf>.

- 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 flow 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 macro-economic 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.

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, p. 16.

Consolidated financial information system for central/local governments: National finance is integrated and managed under the Digital Budget and Accounting System,⁴⁷ which was adopted as a national agenda, separate from the e-government road map 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	<ul style="list-style-type: none"> • Design Accounting Subjects • Unified Settlements and Financial Reports • e-Journal for Standardized Processes • Strengthened Auditing and Self-supporting Accountants
Introduction of Project Budget System	<ul style="list-style-type: none"> • Establishing Project Budgets • Reorganization of Budget Item Structure • Project Budget System Performance Management • Cost Management by Function
Strengthening of Financial Management	<ul style="list-style-type: none"> • Improved Fund Management and Efficient Allocations • Electronic Bill Presentment and Payment • Improved Debt Management • Electronic Funds Transfer
Advancement of Informatization	<ul style="list-style-type: none"> • Design Standardized Local Finance System • Build Local Financial Infrastructure • Connecting/Unifying System

Source: NIA, 2006 Annual Report for e-Government (Seoul, MOGAHA, 2006), p. 14, http://www.korea.go.kr/new_eng/html/files/publications/2006_EGov_Annual_Report.pdf.

⁴⁷ It is also called D-Brain (Digital Brain).

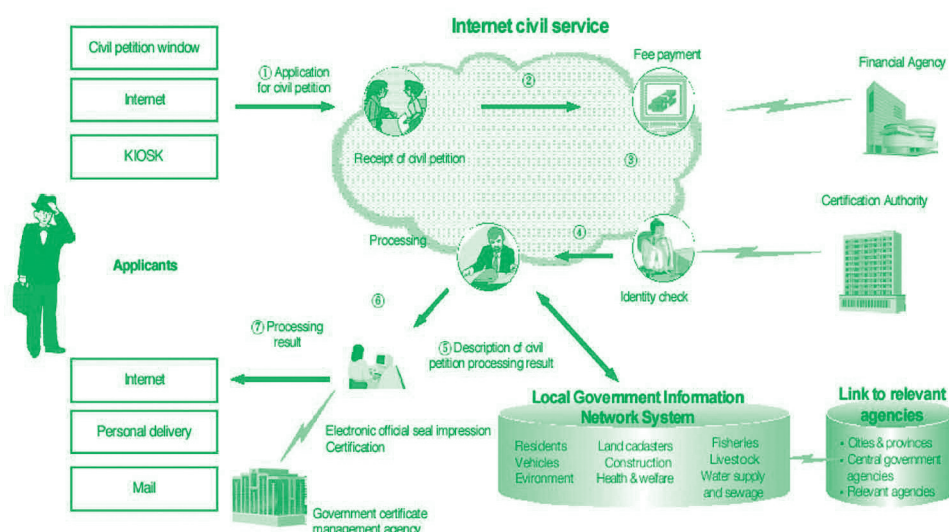
All areas of local finance information systems, including the management of revenue, assets and liabilities, are to be developed and distributed to local governments. The target is to improve the efficiency of local finance management, prevent duplication of investments and enable information sharing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

Local e-Government Information System⁴⁸

On the one hand, there is a need for improving efficiency due to the inefficient manual processing of administrative tasks by simplifying and reforming the paper-based civil affairs process and service delivery 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, standardized administrative information systems for local governments need to be rolled out to regional units to optimize operational efficiency and maximize citizen satisfaction.

The Local e-Government Information System enables real-time information sharing through vertical and horizontal interconnection between central and local governments. More specifically, the informatization project for local governments in the Republic of Korea was introduced to standardize information processing and business transactions. The project, which was implemented over three years starting in 2003, has helped reduce the duplication of investments as well as the digital divide among the local governments in different regions. Efficiency has been enhanced and the quality of government service has also been improved with the introduction of the Local e-Government Information System.

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



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 47, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf>.

⁴⁸ This section is drawn from NCA, *e-Government in Korea* (Seoul, 2002), <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 implementation of a pilot system in four cities in 2000, it was rolled out nationwide, covering 232 cities, counties, and districts. Online civil affairs applications, registration and processing are now available nationwide, and kiosks issuing 37 different certificates have been installed for citizens.

For citizens, the Local e-Government Information System has brought about a significant reduction of paperwork and the number of visits to government agencies. This, in turn, reflects the shift in orientation of government services from being government-focused to citizen-focused.

From the perspective 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 tasks has enhanced efficiency in work process while reducing the administrative burden on civil servants. The central and local governments have an interconnected 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 linked to the G2C portal, which are now accessible 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/district administrations took over the responsibility for resident registration management previously undertaken by Eup/Myun/Dong.

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 identified, and 20 priority projects were approved. The estimated 2,897 types of documents were digitized and shared as needed for one-stop service. In addition, MOGAHA (and now MOPAS) has been assigned to develop information systems by stages and deploy the systems to 244 local governments by 2012.

The e-LGU Project in the Philippines is introduced below.



The e-LGU Project in the Philippines

In response to the passing of the e-Commerce Act of 2000 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). These applications are among the most commonly used in LGUs along with Civil Registry and Payroll. In addition, in order to bring local government computerization efforts closer to the goals of e-commerce, e-payment will be piloted in at least one LGU where the e-government applications are already in place.

The project succeeded in getting all LGUs online with at least a Web presence. 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.

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 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 inconsiderable.

The e-LGU project was implemented in a top-down and centralized way. This is evident in the following: (1) hosting and control over the content of their websites did not reside in the LGUs; (2) the choice of ICT applications for LGUs was limited to three revenue generation systems; and (3) 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>. See also eLGU Community, <http://www.elgu.ncc.gov.ph/>.



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 strengths and weaknesses of the project? What issues need to be addressed to ensure success?

Enhancement of e-Document Exchange⁴⁹

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 cycle of document processing in government agencies.

Statistics on e-document exchange show that 1,724 public entities agencies have exchanged documents online through the Government e-Document Exchange Centre, which includes 77 government departments and agencies, 244 local governments, 194 educational offices, 1,206 public enterprises and schools, the National Assembly, and the National Election Commission. With the adoption of an e-document standard, e-approvals are currently being undertaken in 77 central government departments and agencies, as well as 244 local governments. In 2010, the volume of e-document exchange among public entities was 73.13 million.

Table 5. e-Document exchange among administrative agencies

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agency	46	286	307	550	650	809	893	1305	1724
No. of Exchanges	894	1302	2119	3147	4216	4748	5583	6468	7313

Source: MOPAS, Press Release, 14 January 2011, <http://www.nia.or.kr>.

The high percentage of e-document exchanges and e-approvals shows that electronic document processing has reached a stage of stabilization in the government agencies. All of the central agencies securely exchange e-documents through the government e-Document Exchange Centre. Thus, the government is making efforts to expand e-document exchange 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 effectively classify and manage archives. The national archives management system was established with the adoption of a data management system. A business management system, which keeps records of entire decision-making and business processes as well as outcome and performance, was 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.

After the archives and records management system was completed, the standard was officially announced in consultation with relevant agencies. As a parallel effort, the National Archives and Records Service established the Central Archives and Records Management System.

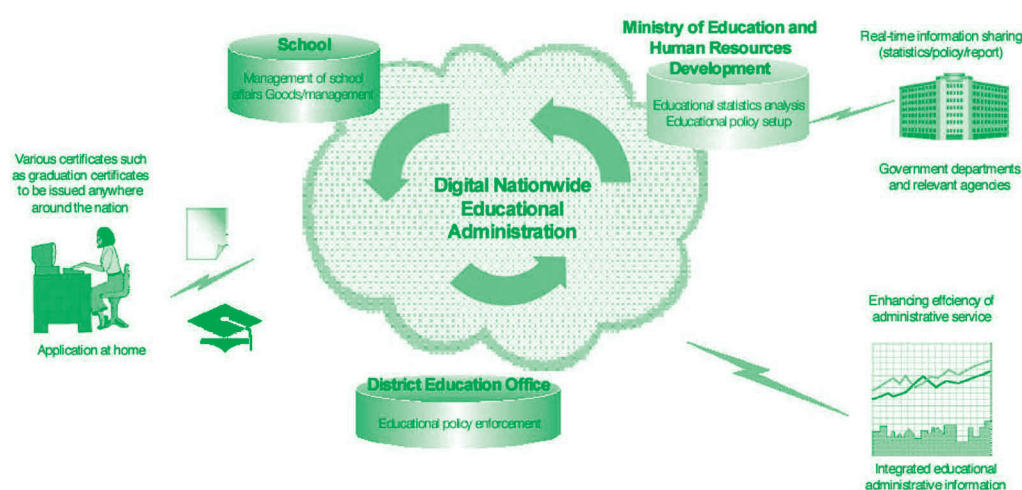
⁴⁹ This section is drawn from "Juicy Details of Korean e-Government", *Korea IT Times*, 29 November 2007, http://www.kdcstaffs.com/it/main_view.php?mode=view&nNum=4575&parts=In-depth.

Education Information System and e-Learning⁵⁰

In 2002, as part of the school informatization policy in the Republic of Korea, every teacher was provided with a PC for instructional and administrative use at school, and one PC was allocated for every eight students. Equipment for the advancement of school facilities and Web-based school local area networks (LANs) were also provided to all of the country's 10,064 schools (222,146 classrooms). Despite evidence of increasingly widespread use of ICTs in education, efficiency in education management and educational information sharing were not improved as educational administration offices pursued informatization separately and there was no common standard in educational administration.

Subsequently, the computerization of educational administration—to unify and integrate information resources in various educational institutions and functional units—was identified as one of the key projects of e-government in the Republic of Korea. The objectives of education informatization include: (1) constructing a foundation for enhancing administrative efficiency; (2) facilitating information sharing through information networks connecting schools, provincial and metropolitan educational offices, and the Ministry of Education and Human Resources; and (3) improving administrative services to meet people's needs.

Figure18. Conceptual diagram of Nationwide Digital Educational Administration in the Republic of Korea



Source: NCA, *e-Government in Korea* (Seoul, 2002), p. 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 for a more efficient, convenient and innovative way of handling educational administration. 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 implemented in 1,364 elementary and middle schools (including 23 public middle and high schools) and 8,500 schools.

⁵⁰ This section is drawn from NCA, *e-Government in Korea* (Seoul, 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 the 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 Comprehensive School Information Management System to improve efficiency, transparency and convenience in educational administration while reducing teacher's workload and enhancing the quality of education by reorganizing the work process. The aim was to reduce the processing time for educational administration by 20 per cent to 50 per cent and the volume of paper documents by 30 per cent, and to increase the productivity of teachers by more than 25 per cent. The issuance of transcripts and certificates of registration or graduation from any school in the country became easily available online. Citizens would also be able to access their school records via the Internet.

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 twenty-first century. Hence, the construction of school LANs and the provision of Internet access to 10,000 schools nationwide after the educational information system had been established.

A LAN for schools is essential to delivering a wide range of capabilities, such as e-learning and Internet access in the classroom. LAN installation 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—two years earlier than the target year. 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.

The establishment of computer labs in elementary and secondary schools has created an ICT-enabled learning environment where students can develop independent learning capabilities. 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 hardware and software foundation has been laid out to promote ICT use in education, train high-quality human resources, and develop and share educational content.

e-Learning: In 2010, the e-learning expenditure of formal educational institutions, government, public institutions, businesses and individuals amounted to KRW 2.224 trillion, representing a 19.2 per cent increase from e-learning expenditures in 2008. 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 formal educational institutions at 23.4 per cent, followed by individuals at 10.9 per cent (see table 6).

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

(units: KRW million, %)				
Demand Sector	e-Learning Expenditures			Average Growth Rate
	2008	2009	2010	
Formal Educational Institutions	70 804	96 434	106 768	23.4
Government and Public institutions	167 207	143 806	151 255	-4.4
Businesses	812 052	886 283	963 139	8.9
Individuals	816 765	945 369	1 003 177	10.9
Total	1 866 828	2 071 892	2 224 339	9.2

Source: Ministry of Knowledge and Economy and National IT Industry Promotion Agency, *e-Learning Industry Status Survey* (2010), <http://www.nipa.kr/board/boardView.it?boardNo=77&contentNo=415&menuNo=292>.

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 by introducing real-time classes linking various schools online. Through various methods such as the Internet and IPTV, 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 with a minimum speed of 2 Mbps by 2006. This was 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 e-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 reach the level of other OECD member nations

Through various methods such as the Internet, digital TV and IPTV, the Korean government intends to expand and develop a more effective system of cyber universities for earning credits without constraints on time and place. The government is making an effort to improve the system of credit pooling 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.



Test Yourself

1. List the common G2G services.
2. Explain why it is important to implement the integrated finance system between central and local government.
3. Describe the e-learning system in your country.
4. What are the ways in which government can promote e-learning and encourage citizens to participate in e-learning programmes.



Something To Do

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

3.5 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 connected government services. In this context, this section will discuss the following:

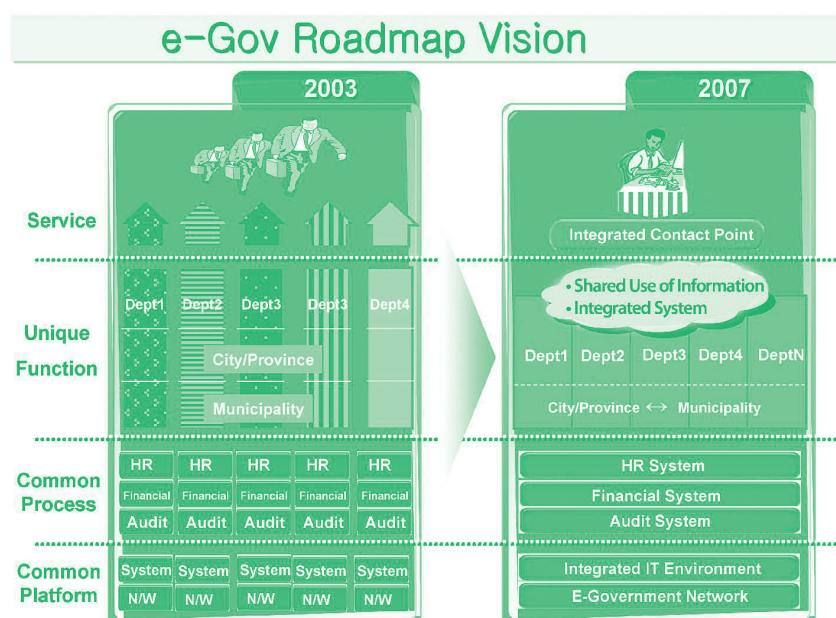
- Government integrated computing and data centre
- e-Government standardization
- e-Government shared services
- e-Community centres

National Computing and Information Agency⁵¹

The Republic of Korea's National Computing and Information Agency (NCIA) was established as the national backup system for information resources, including information systems and human resources that previously used to be operated and managed by individual government agencies (see figure 19). This project aimed to strengthen the whole-of-government management of ICT and promote joint use of resources for efficiency improvement, while at the same time serving as a backup system in case of system failures.

Centre 1 and Centre 2 operate an integrated information system for 48 government agencies. The first centre was built in October 2005 in Daejeon, co-locating the information systems of 24 government agencies, including MOGAHA. The second centre was completed in July 2007 in Gwangju, accommodating the information systems of 24 other agencies. The two centres are distantly located to duplicate each other for double backup and recovery.

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, p. 23.

Integrated Computing Centre 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.

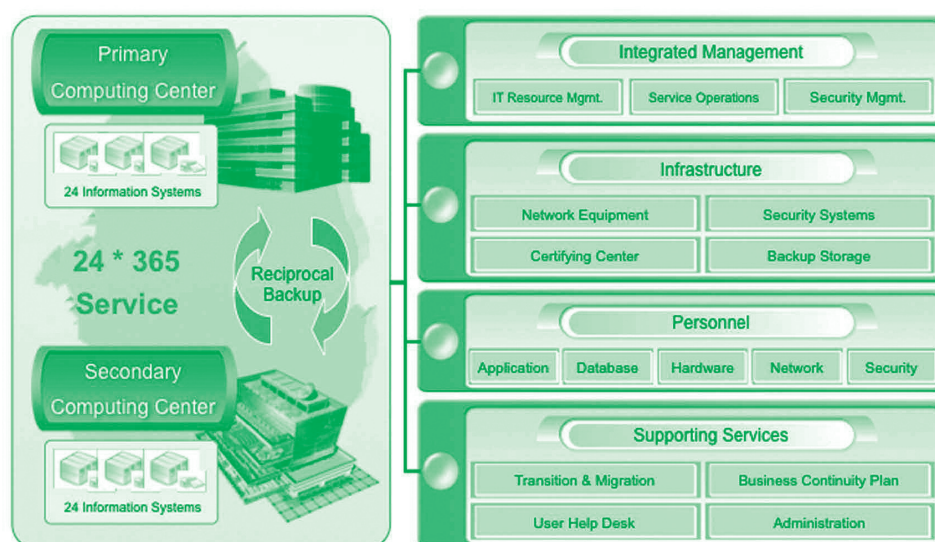
The security and stability of e-government operations are assured with world-class systems management and standardized professional operation services. n-TOPS (National Total Operation Platform System), a standard system operation process developed by NCIA, was certified with ISO 20000 in IT service management.

⁵¹ This section is drawn from Informatization Strategy Office, *Korea e-government* (Seoul, MOPAS, 2007), p. 30.

System operation is enhanced by periodic checks to prevent failures. Professional teams are available to deal immediately with system breakdowns. In addition, security is reinforced by periodic hacking exercises, vulnerability check-ups and a 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 Centre architecture



Source: Soh Bong Yu, "e-Government of Korea: How we have been working with it", KADO presentation, p. 17.

e-Government Standardization

As stipulated in Article 21 of the Framework Act on Informatization in the Republic of Korea, in addition to technical standards, 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 process, 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, enhanced reusability and shared use between systems through unified guidelines, quality maintenance, and 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. The study shows that 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 recommends.

MOGAHA's standardization efforts were developed along with the administrative informatization process in the 1990s. MOGAHA 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 were standardized by January 2005. Also, multi-functional office devices were standardized in 1987 with revisions 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.

To accelerate e-government standardization in accordance with the Act on e-Government, MOGAHA took the standardization processes out from the information resource management project. Subsequently, 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.

In addition, there are plans to analyse and improve on the 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 Services⁵²

One of the most challenging aspects of e-government is the integration of information systems in a way that different agencies suitably interact with each other by sharing activities, processes and services. Shared services are a business approach and an ICT architecture designed to allow agencies to share key parts of their infrastructure, applications and business processes within their own organization, with other agencies and with the general public. They include common administrative business systems like human resources, accounting, logisticsd 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 18 systems of 11 different agencies are in operation. As shown in table 7, the prioritized services include: 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 save costs.

⁵² This section is drawn from NIA, *2006 Annual Report for e-Government* (Seoul, MOGAHA, 2006), pp. 38-39, http://www.korea.go.kr/new_eng/html/files/publications/2006_EGov_Annual_Report.pdf.

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

Field	Proposed Service		Organization	
Citizen Service	Prioritization	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, 2006 Annual Report for e-Government (Seou.: MOGAHA, 2006), p. 39, http://www.korea.go.kr/new_eng/html/files/publications/2006_EGov_Annual_Report.



Questions To Think About

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

e-Community Centres

The Republic of Korea's Information Network Village (INV) project aims to achieve balanced development across the nation by connecting the Internet to remote areas, such as in farming and fishing villages. It is also intended to bridge the digital divide and boost the local economy through the distribution of PCs to each household and provision of computer training to the villages.

Through the INV project, direct transactions between urban dwellers and farmers are fostered: the rural communities become capable of marketing their fresh farm products; while city dwellers are given the opportunity to buy fresh produces at affordable prices, and experience rural life through such revenue models as guesthouses, camps and farm experience tours.

The first 25 INVs were built in 2002, and a total of 363 INVs have been established since the launch. The INV won the 2011 United Nations Public Service Award.



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?

3.6 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 information accessible, and sharing best practices and technology.⁵³

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, made available at the right place, and presented in the right shape while satisfying quality requirements at the lowest possible costs for use.
- 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:

- Who
- What
- When
- Where
- Why

⁵³ Joo-Haeng Choo, "Introduction to KMS", presentation made in 2007.

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 support⁵⁴

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.⁵⁵



The Republic of Korea's e-Knowledge Management System (On-Nara Business Process 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.

⁵⁴ Ibid.

⁵⁵ Ibid.

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 was completed. The entire administrative procedure was integrated into a management system after the management system for archives and knowledge had been established.

The e-KMS has increased the efficiency and transparency of administration by handling, recording and managing all government business procedures online in a standardized way. In this system, all businesses engaged in by the government are classified according to functionalities and goals. Furthermore, business progress and performances are systematically managed down to the most basic unit task. Document creation and business procedures are standardized and decision-making processes are recorded to ensure accountability and transparency of public administration. In addition, easy access to information on similar policies is provided to ensure continuity in policymaking while safeguarding against policy failures.

Source: Abridged from NIA, 2006 Annual Report for e-Government (Seoul, MOGAHA, 2006), p. 20, http://www.korea.go.kr/new_eng/html/files/publications/2006_EGov_Annual_Report.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.

3.7 Health and Telemedicine Applications: Increasing health services availability⁵⁶

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.

⁵⁶ 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>.

e-Health encompasses the use of digital data in the health sector—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.

Table 9. Examples of e-health

Technology	Devices and software	e-Health applications
Remote monitoring	<ul style="list-style-type: none"> • Sensors • Instruments • Ultrasound 	<ul style="list-style-type: none"> • Telehomecare
Diagnostics	<ul style="list-style-type: none"> • Stethoscope • Electrocardiogram (EKG) • X-ray/CatScan and medical image analysis software • Consultations 	<ul style="list-style-type: none"> • Telehomecare
Videoconferencing	<ul style="list-style-type: none"> • Cameras (videocams, webcams) • Computer-based desktops • Portable communication and data systems 	<ul style="list-style-type: none"> • Consultations • Teledermatology • Telementalhealth
Digital imaging	<ul style="list-style-type: none"> • Instruments • Media (e.g. film, magnetic tape) • Scanners/viewers • Digital cameras • Videocams with scopes 	<ul style="list-style-type: none"> • Telepathology • Teleradiology • Teledentistry • Teledermatology
Information technology	<ul style="list-style-type: none"> • Data storage systems servers • Software/informatics • Database management systems • Geographic information systems • Middleware 	<ul style="list-style-type: none"> • Electronic medical records (e.g. patient information system, hospital information system, general practitioner information system) • Data mining, Web portals • DSS administration
Store and forward	<ul style="list-style-type: none"> • Data/image/audio card capture/scanners • Computer/camera/microphone and image management software 	<ul style="list-style-type: none"> • Electronic medical/health records • Report generator
Simulation and training	<ul style="list-style-type: none"> • Multimedia graphics and software • Audio-visual 	<ul style="list-style-type: none"> • e-Learning • Curriculum • Conference

Source: Adapted from David Brantley, Karen Laney-Cummings and Richard Spivack, *Innovation, Demand and Investment in Telehealth* (U.S. Department of Commerce, 2004), <http://www.hrsa.gov/ruralhealth/about/telehealth/innovation.pdf>.

As table 9 illustrates, 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 personal digital assistants (PDAs), 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, in addition to the process in obtaining it.

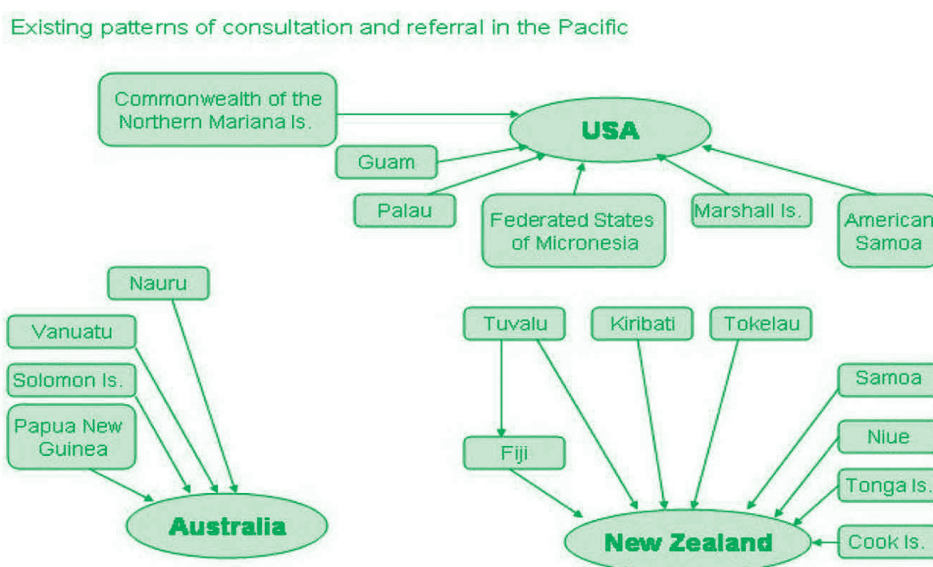
Integrated patient management and patient health records – This concerns activities surrounding the efficient and secure sharing of information between health- and social-care professionals, and the establishment of an environment to provide support for integrated client case management.

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).
2. Continuing education for health personnel enhances professional development by improving 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.
3. Cross-border surveillance detects 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, 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 enable trained individuals to transcribe medical records dictated by physicians and other health-care providers.

Figure 21. Teleconsultation topology in the Pacific Islands



Source: Isao Nakajima, "Issues concerning e-health applications in developing countries, especially in the Pacific", presentation made 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.

Box 7. World Health Organization on e-health

e-Health has increasingly served 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.

5. Elimination of duplication or errors, savings in time and travel costs, as well as more efficient allocation of human and other resources result 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.

3.8 Disaster Management Application: Integrated national disaster management services⁵⁷

ICT can potentially play a key role in disaster risk management. ICT encompasses both traditional media (radio, TV) as well as new media (cell broadcasting, Internet, satellite radio), all of which can play a major role in lessening the risks brought on by disasters through early warning, coordinating and tracking relief activities and resources, recording and disseminating knowledge and experiences, and raising awareness. Disaster management activities, in the immediate aftermath of a disaster, can be made more effective by the use of appropriate ICT tools. These include tools for resource management and tracking, communication under emergency situations (e.g. use of Internet communications), collecting essential items for the victims, and national and international fundraising.⁵⁸

The application of ICTs can be divided into two broad usages in disaster risk management.⁵⁹ The first set of usage is associated with “knowing the risks”, including being aware of them and having access to relevant information on these risks to be able to minimize these risks in a timely manner. ICT applications that are used to enhance information management, forecasting, modeling, monitoring and risk mapping in support of decision-making falls into this category. It also includes ICT applications for teaching and learning, and for raising awareness.

The second area of usage focuses on how best to “manage risks” by utilizing available ICT tools, including the Internet, phones, TV and radio, in alerting communities of impending disasters, in coordinating response and rescue, and in managing programmes and projects.

An efficient national emergency management system is also needed to minimize the impact of disasters. In the Republic of Korea, the National Emergency Management Agency focuses on prevention-oriented disaster management, rather than reconstruction and compensation. Accordingly, the Agency has set up the National Disaster Management System (NDMS) deploying disaster monitoring systems to 10 government agencies, including the Ministry of Agriculture and Forestry, and the Ministry of Maritime Affairs and Fisheries. In 2006, the NDMS

⁵⁷ This section is drawn from NIA, *2006 Annual Report for e-Government* (Seoul, MOGAHA, 2006), p. 23, http://www.korea.go.kr/new_eng/html/files/publications/2006_EGov_Annual_Report.pdf.

⁵⁸ Prof. Krasae Chanawongse, “Foreword”, in *ICT for Disaster Management*, Chanuka Wattegama (Bangkok, UNDP-APDIP and Incheon, APCICT, 2007), p. vi, <http://www.unapcict.org/ecohub/resources/ict-for-disaster-management>.

⁵⁹ UN-APCICT/ESCAP, *ICT for Disaster Risk Reduction*, ICTD Case Study 2 (Incheon, 2009), p. 27, <http://www.unapcict.org/ecohub/ict-for-disaster-risk-reduction-1>.

also established a cross-agency disaster management network on a pilot basis to strengthen partnerships among 71 agencies. Information dissemination 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 a 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 and the elderly. When the u-Safe Korea Project was completed around 2010, it was expected that the death toll from disasters would 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 was 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 2004 Indian Ocean tsunami 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 free and open source software (FOSS) application that is liberally licensed to grant the right of users to use, copy, change and improve the software through the availability of its source code. 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 (refer to 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 pledge locations (camps, hospitals, etc.), and support from relief providers.
- **Shelter 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, Haiti, Indonesia, Myanmar, Pakistan, Peru, the Philippines and the US, in response to disasters:

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 in the Philippines by the Government of the Philippines	2006
Sarvodaya, an NGO in Sri Lanka	
Terre des Hommes, an NGO in Sri Lanka	
After the Yogyakarta Earthquake, Indonesia	
After the Peru Earthquake	2007
New York City Office of Emergency Management, USA	
After the Sichuan Earthquake, China	2008
After Cyclone Nargis in Myanmar	
After the Haiti Earthquake	2010

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

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

Isuru Samaraweera, "Sahana Disaster Management System and Tracking Disaster Victims", presentation made at the 24th Asia-Pacific Advanced Network Meeting, Xi'an, China, 27-31 August 2007, <http://www.apan.net/meetings/xian2007/presentations/dm/sahana.ppt>.

Mifan Careem, Chamindra de Silva, Ravindra de Silva, Louiqa Raschid and Sanjiva Weerawarana, "Sahana: Overview of a Disaster Management System", in *Proceedings of the International Conference on Information and Automation*, Colombo, Sri Lanka, 15-17 December 2006, <ftp://ftp.umi.acs.umd.edu/pub/louiqa/PUB06/Sahana6.pdf>.

Nah Soo Hoe, "Managing Disasters – Sahana, Sri Lanka", in *Breaking Barriers: The Potential of Free and Open Source Software for Sustainable Human Development - A Compilation of Case Studies from Across the World* (Bangkok, UNDP-APDIP, 2006), pp. 56-63, <http://www.apdip.net/publications/ict4d/BreakingBarriers.pdf> and <http://www.iosn.net/foss/humanitarian/projects/sahana/>.

Wikibooks, "Sahana", <http://en.wikibooks.org/wiki/Sahana>.

To find out more about the effective use of ICT for Disaster Risk Management, see Module 9 in the *Academy of ICT Essentials for Government Leaders* module series.⁶⁰

⁶⁰ See also UN-APCICT/ESCAP, *ICT for Disaster Risk Reduction*, ICTD Case Study 2 (Incheon, 2009), <http://www.unapcict.org/ecohub/ict-for-disaster-risk-reduction-1>.

4. TRENDS AND FUTURE DIRECTIONS FOR E-GOVERNMENT

4.1 Trends in e-Government⁶¹

As noted earlier, the *United Nations e-Government Survey 2010* is recognized for providing a comprehensive analysis of national online services, telecommunications infrastructure and human capital. The Survey has made some significant observations and suggestions. One of the issues the Survey is focusing on is the “citizen-centric practice”. For a country to be assessed favourably in e-government, there needs to be solid evidence of an approach to e-government development that places citizens at the centre. The Survey shows, for example, the availability of electronic and mobile services designed with citizens in mind.

Another word to watch is “development”, which replaces “readiness”. The term “e-government development” describes how far governments have actually advanced in this field instead of how ready or able they might be to do so, which was how “e-government readiness” described national capacity. More countries than ever before are adopting national e-government strategies and multi-year action plans. From the most to the least developed, countries are responding to expectations that governments both participate in and enable the information society by communicating and interacting more effectively with increasingly technology-savvy citizens. They are ready, and it is their level of development in this regard that must be assessed.

For many of the least developed countries, their level of e-government development remains low due to the cost of technology, lack of infrastructure, limited human capital and a weak private sector. A paucity of public sector resources clearly imposes a drag on government innovation. Small ad-hoc and stand-alone projects are the norm in least developed countries, which often lack a well-thought out e-strategy within their national development plans. Once initial funding for these projects ends, they are usually at high risk of simply shutting down.

Problems of resources are in no way limited to developing countries. The 2010 assessment of government websites has revealed that many national governments continue to focus on online and mobile dissemination of information rather than expansion of interactive services often because of the expense and complexity of rethinking back-end systems, procedures and staffing. A solution might be found in incremental expansion of e-services guided by sound institutional principles with a core objective of integration. Even simple solutions to discrete problems can result in substantial local efficiency gains and increased public satisfaction.

Despite technological progress, the lack of ICT professionals (i.e. human capital) remains a major shortcoming in both middle- and low-income countries. Few civil services are able to compete with private sector salaries, with the inevitable result that top ICT personnel in developing countries tend to gravitate towards commercial firms. Even in cases where governments are able to recruit highly skilled ICT workers, they tend to stay only long enough in their government jobs to acquire enough experience to make them marketable in the more lucrative private sector. Similar capacity gaps exist at the management level. Developing country governments often find themselves in the position of having to hire expatriate management consultants and other ICT professionals to develop domestic e-government services.

⁶¹ This section is drawn heavily from United Nations Department of Economic and Social Affairs, *United Nations e-Government Survey 2010*, pp. 3-5 (see footnote 24).

In addition, the Survey points out the disconnection between e-government supply and demand. One reason for the disconnection may be ineffective marketing. Another may be that the majority of ICT initiatives are designed as efficiency measures (e.g. to automate complex functions such as income tax collection, school registration and processing of social benefits) with little input from the intended beneficiaries. Most surveys have shown that users prefer localized and personalized services, attributes that usually call for interdepartmental cooperation, back-office reorganization and reallocation of both human and financial resources. These requirements are not often taken into account.

e-Participation still remains at its early stage in many countries. Many governments include polls and feedback forms on their websites, but few sponsor discussion forums or blogs or post information to social networking sites. This is especially true for developing countries. Governments may need to be more creative about the ways they interact with the citizens by creating integrated “one-stop shop” portals or actively soliciting views that can be used to design public services or to shape public policy.

4.2 m-Government

According to the key findings from the *United Nations e-Government Survey 2010*: “On-demand access to information, services and social networks on the Internet through a PC is no longer considered cutting-edge in developed regions but a norm that many people take for granted. The same may soon be true of the more advanced middle income countries. Cellular telephones and personal digital assistants have the potential to play the same role for developing countries if governments are able to come to terms with the changing face of technology and innovate with a citizen-centric mindset.”⁶²

In 2010, the global mobile subscription exceeded 5.3 billion—that is equivalent to 77 per cent of the world population.⁶³ Globally, the number of mobile phones surpassed the number of fixed/wired phones in 2003. According to ITU, at the end of 2010 there were 3.8 billion mobile subscriptions in the developing world—that is 73 per cent of global subscriptions. Mobile phones are a crucial mode of communication in developing countries, especially those lacking an infrastructure of fixed lines. Thus, mobility is an indispensable asset for the governments in meeting the demands of their citizens. The relevance of m-government lies in the fact that it is particularly suited for developing countries where Internet access rates are low but mobile phone penetration is growing rapidly, particularly in urban areas.

Mobility is increasingly being accepted as a part of daily life and the governments have to transform their activities according to this demand of convenience and efficiency of interactions. m-Government helps to make public information and government services available anytime, anywhere to citizens and businesses. Examples include sending security alerts, reminders to renew licenses, results of medical examinations, and tax returns. Most of these efforts are still at the experimental stage and limited in scope, but they nonetheless present an unavoidable shift in the future evolution of e-government.⁶⁴

62 United Nations Department of Economic and Social Affairs, *United Nations e-Government Survey 2010*, p. 3.

63 ITU, “Key Global Telecom Indicators for the World Telecommunication Service Sector”, updated on 21 October 2010, http://www.itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom.html.

64 Rain Rannu, Siim Saksing, and Triin Mahlakõiv, “Mobile Government: 2010 and Beyond – White Paper”, Mobi Solutions, Ltd., January 2010, <http://www.mobisolutions.com/files/Mobile%20Government%202010%20and%20Beyond%20v100.pdf>.

e-Government efforts aim to benefit from the use of ICTs, especially Web-based technologies in carrying out governments' fundamental functions. Now these functions are transformed and extended by using mobile platforms. Benefits of m-government include:

- Cost reduction
- Efficiency
- Transformation/modernization of public sector organizations
- Added convenience and flexibility
- Better services to the citizens
- Ability to reach a larger number of people through mobile devices than would be possible using wired Internet only.⁶⁵

Reasons Behind m-Government

According to Rannu and others, a move toward m-government can be explained by the following reasons:

- **Wider reach** – Because mobile penetration exceeds Internet penetration, public services that are offered via mobile phone are available to a greater number of people than those offered on the Internet.
- **Always carried, always on** – Because people carry their mobile phones with them all the time, while most computers are connected to a specific location, public services that are offered via mobile phone are accessible everywhere and at all times. This is especially important in case of urgent messages and crisis communication.
- **More personalization for targeting users** – Computers are shared among different users, but mobile devices are designed for a single user. Information reaches to the preferred addressee at any time through one specific device.
- **Cost-effective** – m-Government provides many cost saving opportunities for the government as well as for the citizen (data gathering, sending a stamped letter versus the price of an SMS, etc.)
- **Better management** – New technology can help government officials to better manage allocated financial and human resources.
- **Faster information flow** – Mobile technologies enable government staff to save time. A decrease in time for transferring data results in better decisions within a shorter time. It also enables access to data in service site so that they can spend time on their job rather than travelling around for information.
- **Increased democracy** – As an extension of e-government, m-government is expected to transform the relationship between citizens and governments, and encourage the proactive participation of citizens in decision-making and policy formulation.
- **Solution to the digital divide** – Mobile technology is probably the most rapidly expanding of technologies in terms of the speed of expansion and reach to the unconnected. The technology is mostly based on voice and SMS, but with the rapid growth in mobile phone usage, more sophisticated mobile services are being introduced, the most widely known being m-banking (allowing people to pay, receive and transfer money using a mobile phone), m-commerce (the buying and selling of goods and services), m-health (for health research and healthcare delivery), and m-learning.
- **Better the lives of disabled** – SMS can be helpful for those who are hearing-impaired, for example. Many hearing-impaired people find text-messaging to be an ideal form of communication, as no audible conversation is needed.⁶⁶

⁶⁵ I. Kushchu and M. H. Kescu, "From e-Government to m-Government: Facing the Inevitable", in the Proceedings of the 3rd European Conference on e-Government, Dublin, Ireland, 3-4 July 2003, pp. 253-260.

⁶⁶ Rain Rannu, Siim Saksing, and Triin Mahlakõiv, "Mobile Government", pp. 10-11.

Although it is often argued that m-government is just a mobile technology-specific sub-category of e-government, m-government is not only about applying mobile technology but rather how mobile technology transforms the government. Hence, the design and implementation of m-government is more complex than implementing e-government as governments need to identify the mobile technologies and applications relevant to service convenience and efficiency. In addition, although there is a four stage development model for e-government by the United Nations, there is no model for m-government.

Classification of m-Government Services

m-Government services can be classified into two groups; push and pull services. Push services are passive in nature where end-users usually receive notifications about certain activities or events. On the contrary, pull services ask users to play a more active role in either initiating the service or responding to queries via mobile devices.

m-Government is the extension of e-government as well as the strategic use of e-government services beyond the barriers of location and time, which are only possible using mobile telephones, laptop computers, PDAs and the wireless Internet infrastructure.

SMS-based e-government services are part of the m-government domain. SMS-based e-government can be classified into six levels based on the service offerings: Listen, Notification, Pull-based Information, Communication, Transaction and Integration. The proposed model uses the term “level” because it represents the available service offering and not the direction of the systems’ evolution. Each level is independent of the others and can complement each other (one/more level can be added to another level). The model ranks the levels according to the complexity of the system and the benefits received by citizens (see box 8).

Box 8. Six-level model of SMS-based services

Listen level

On the first level, current SMS-based e-government applications have been widely used by governments to listen to citizens’ opinions, reports and complaints. Most of the systems in this level use SMS to enable citizens to send messages directly to mayors, councillors, the council, and the local authority. However, these systems are not designed to reply to the input-messages or to inform the sender of the following actions. This one-way communication mode from citizens to government is categorized as the Listen level.

Notification level

In the second level, current SMS-based e-government systems have enabled one-way communication from government to citizens. The government is able to notify citizens about their personal information and to broadcast important public information. This model classifies these applications as Notification level. Services in this level use Push-based mechanism, which sends the messages to citizens activated by data on the server, not by a user’s request.

Pull-based information level

Current SMS-based e-government systems also provide two-way communication that enables citizens to access public or personal information by sending a request-message. The services use the pull method: citizens send a “request SMS” to the service and the replied service is sent back to the sender’s handset via SMS. The information options provided by services in this level are limited and the request-text must be in a certain format.

Communication level

There are some existing SMS-based e-government systems that provide two-way communication between government and citizens in which the people can inquire, complain or report about anything (without worrying about the text format) and get responses/replies immediately. This level is the Communication level.

Transaction level

Some SMS-based e-government systems can process transactions. Through these systems citizens can pay bills, and send or update their personal data through SMS. Since citizens can do any transaction (money and data) with the government agencies any time anywhere in a secure channel, this level offers more benefits in the accessibility, availability, accuracy, responsiveness, courtesy and helpfulness, timeliness, trust, privacy and security. However, trust and security are still the dominant issues.

Integration level

Finally, the ultimate level of this model is when all the SMS-based systems are integrated and organized in a single portal so people just send messages to a single service number for all services. This level predicts that the integrated-SMS systems will also be integrated with the Internet/Web-based e-government systems so citizens have the option to access government services by sending SMS to one number or through the Internet at one Web address. The SMS and the Internet may complement each other in a service, for example: a citizen may send a form or pay for a public service electronically by Internet and receive notification via SMS, or pay the services through SMS and receive the receipt by e-mail.

Source: Abridged from Tony Dwi Susanto, Robert Goodwin and Paul Calder, "A Six-Level Model of SMS-based eGovernment", paper presented at the International Conference on E-Government (ICEG), Melbourne, Australia, 23-24 October 2008, <http://smsegov.info/images/smsegov.pdf>.



m-Government Services in Practice

Bangladesh – SMS saves lives

The Government of Bangladesh is piloting early warning dissemination using cell broadcasting technology. While SMS is a one-to-one and one-to-a-few service, cell broadcasting is a one-to-many geographically focused messaging service, which means that messages can be tailored to multiple phone subscribers located within a give part of its network coverage area at the time the message is broadcast. Cell broadcasting is also not as affected by traffic load; therefore, it may be used during a disaster when load spikes tend to crash networks.

China – Chinese Aged Diabetic Assistant (CADA)

CADA is a smartphone-based self-management and support system for elderly diabetics in China. The project will use smartphones to send elderly diabetics recommendations and guidelines related to physical activity, glucose and blood pressure monitoring, weight measurement and diet. Patients will be trained to enter and send data on glucose levels, and doctors will be able to track patient data and graphically display data for patients.

India – Mobile phones for fishermen

The introduction of mobile phones in the coast of Kerala (South India) allows improved flow of price information leading to a more efficient functioning of the market. Mobile phones enable price information from other markets to be available while the fishermen are still at sea. The fishermen divert their boats to the market that offers the highest price for their catch. After mobile phones were introduced, the practice of dumping fishes overboard stopped;

fishermen's profits rose by 8 per cent and consumer prices fell on average by 4 per cent; the "law of one price" came into effect where a single rate for sardine was obtained along the coast.

Philippines – PAYBIR

The Bureau of Internal Revenue in the Philippines offers a service called "PAYBIR" where a taxpayer can file his or her income tax returns by SMS. Through the PAYBIR service, taxpayers can now pay their tax of PHP 10,000 (USD 250) and below through a text message. PAYBIR has forged a partnership with Land Bank of the Philippines as the accredited agent bank and Globe Telecom as the taxpayer agent. Globe Telecom uses its G-Cash facility to make tax payments on behalf of its subscribers.

m-Government Applications Development

One of the main questions that might be raised for building m-government is whether to create a mobile application or a mobile website. The mobile Web refers to the use of Internet-connected applications, or browser-based access to the Internet from a mobile device, including smart phone or a tablet PC. Access to the Web traditionally has been over fixed-lines, however, the Web is becoming more accessible by portable and wireless devices. Mobile applications are application software developed for small low-power hand-held device such as PDAs or mobile phones. m-Government applications can be downloaded from various mobile software distribution platforms.

There are some cases where a mobile application is more appropriate than a mobile Web and vice versa. Some of the discussions on the pros and cons of each of these options are presented in table 10.

Table 10. Mobile applications vs. Mobile Web

	Mobile Application (or app) (Application designed to run on a specific mobile device—download and installation required)	Mobile Web (Website created specifically for mobile device—accessible through mobile browsers, no download or installation required)
Portability	Needs to be developed for each platform (iPhone, Blackberry, Android, Palm, etc.)	Common Platform
Hyperlinks	Possible to link to an app but since most users will not have the app installed, the most effective way is to link to the download page for this app. Possible to link from an app externally to other websites.	Possible to provide links to different pages on your mobile site and to link from your mobile site to other websites.

	Mobile Application (or app)	Mobile Web
	(Application designed to run on a specific mobile device—download and installation required)	(Website created specifically for mobile device—accessible through mobile browsers, no download or installation required)
Supportability and Maintenance	Difficult to support and maintain after app is downloaded. Every new release with bug fixes requires to go through the entire approval process of the app store. After new version of app is placed in the store, it requires all existing users to upgrade.	Easier to support and maintain as developer has complete access to the site. No need to upgrade, all users see the latest version.
Performance	Able to achieve high performance through app code that runs locally on the device.	Performance largely depends on how the mobile website is designed and bandwidth.

Source: Adapted from DudaMobile, "Mobile Web vs. Mobile Apps", 7 September 2009, <http://blog.dudamobile.com/mobile-web-vs-mobile-apps/>.

In addition to the mobile Web and mobile application, another application development type is a hybrid mobile application. Hybrid applications access the mobile website through an app, bringing together features of both Web and native applications. In general, hybrid applications can present features as follows:

- Can function whether or not the device is connected
- Integration with a device's file system
- Integration with Web-based services
- An embedded browser to improve access to dynamic online content

No single approach for developing mobile applications delivers all of the benefits all of the time. Choosing the right approach depends on the specific needs of the government and can be driven by many parameters such as budget, timeframe, internal resources, target market, required application functionality, wireless infrastructure, and many other factors. One thing is clear, however, as seen in the private sector. Most companies today face an obvious trade-off between user experience and application functionality on one hand, and development costs and time to market on the other. Similarly, the challenge for m-government is boiled down to choosing the right development approach that will balance the government's and citizens' requirements with its budget and time constraints.

m-Government Implementation Issues

Implementing m-government brings a series of challenges. Some of the typical challenges for e-government are naturally shared by m-government efforts. According to Kushchu, among them, those which are most relevant to m-government are as follows:

- Developing wireless and mobile networks and related infrastructure
- Promoting mobile penetration and increasing accessibility
- Protecting privacy and providing security for the data and interactions
- Regulating and developing legal aspects of mobile applications and use of the services⁶⁷

⁶⁷ Ibrahim Kushchu, *Mobile Government: An Emerging Direction in e-Government* (Hershey, IGI Global, 2007).

4.3 Future Directions for e-Government

As ICT has become an integrated part of everyday life, e-government has also become an integral part of government transformation, and will continue to grow and expand rapidly with changes in focus and direction. The change of focus and direction will be highly dependent on the challenges faced by governments and the technological progress in the ICT sector. Countries recognize that e-government has become a unique and powerful tool for governments, which has contributed to making public administration significantly more efficient and effective. It has forced governments into rethinking organizations, responsibilities, business processes, and collaborative and cooperative arrangements within and across levels of government, and also forced governments to take a whole-of-government view of their service provision to citizens and businesses.⁶⁸

Despite much progress made during the past decades, e-government has not yet delivered all of its promises. Countries are still looking into how to harness the full benefits of e-government, and are asking how e-government can be used to support and enhance broader economic development. At this point, mega-trends in e-government development include the following:

- From cost reduction to better government
- From rationalization to growth facilitation
- From central to local
- From government-centricity to citizen-centricity⁶⁹

Addressing these trends will be challenging for many governments, but it will be difficult for them to avoid. Also the issue of how to ensure sufficient competencies and skills to further develop public service delivery is a growing concern in many countries. The need for engaging private sector competencies and skills to complement government efforts should be discussed, including how public-private partnerships could be used.⁷⁰

Implementation of e-participation may lead to a review of democratic processes and institutions. According to Mohan and others, the focus of e-government will shift to continuity and content management in the developing nations. The more advanced among developing nations will try to embark onto the connected government paradigm. And e-inclusion will become the chief concern for sharing the benefits of a functioning e-government across the society.⁷¹

The developed nations shall keep pursuing the goals of connected government, service innovation and huge amount of cost savings by leveraging e-government for asset and employee consolidations. The consolidations will obviously require a radical way of structuring government organizations and hierarchies. Restructuring is likely to be radical across organizational boundaries, challenging traditional structures, which is an intriguing political question. Better regulation and policymaking that fundamentally reduce the demand for interaction with government are expected, thereby decreasing the administrative burden on government, citizens and businesses. Thus, e-government will be focusing on the creation of public value, burden reduction, inclusiveness and yield.⁷²

68 OECD, *Future of e-Government Agenda 2020: OECD Leaders Conference 2008 – Main Conclusions* (Paris, 2008), <http://www.oecd.org/dataoecd/55/12/42547008.pdf>.

69 Ibid., p. 11.

70 Ibid.

71 Mohan Datar, Anil Panikar and Jamal Farooqui, "Emerging Trends in E-Government", in *Critical Thinking in e-Governance*, Jaijit Bhattacharya, ed. (New Delhi, GIFT Publishing, 2008), p. 44, <http://www.csi-sigegov.org/critical.html>.

72 Booz Allen Hamilton Inc., "Beyond e-Government: The world's most successful technology-enabled transformations", A study commissioned by the UK Cabinet Office, 2005, p. 13, <http://www.boozallen.com/media/file/151607.pdf>.

On the other hand, the focus of developing nations will be on creating an information infrastructure both within the public sector and across society at large, and delivering services through more efficient and citizen-centric governance models encompassing multiple delivery channels. The developing nations will simultaneously pursue the bridging of the digital divide and streamlining front office and back office functions.

SUMMARY

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

1. The use of 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:
 - Few people know how to make use of available e-government services.
 - Few people understand what benefits e-government can bring them.
 - The majority are reluctant to use e-government services.
2. One way to address these problems is to develop truly compelling high priority e-government applications based on the needs and expectations of citizens and businesses. Such applications would give rise to what are known as “killer” ICT applications in G2C and G2B.
3. A multi-channel, single-window government is becoming increasingly popular because a multi-channel approach provides different options/means of access (e.g. through the Internet, e-mail, mobile and digital TV), which encourages more participation by citizens and businesses in e-government. This approach tends to deliver better results than a single channel approach.
4. There are many stakeholders in e-government. Different ICT applications in the areas of G2C services, G2B services and G2G services will help meet the different needs of target groups.
5. The integration of government-wide computing resources such as hardware, network infrastructure, ICT personnel and management will produce greater benefits, including cost reduction and management efficiency. A joined-up approach or whole-of-government approach is recommended to facilitate cooperation and coordination within and between government agencies.
6. e-Government standardization gives rise to positive outcomes such as interoperability, consistency, reusability and quality maintenance.
7. e-Government is not a one-time activity or one-shot approach to be completed in a short period of time, but a long-term evolutionary process. A country cannot achieve all conceivable e-government goals with a single initiative. It is recommended to implement a series of national e-government initiatives, building on the past and current achievements.
8. e-Government of the future will be characterized by seamless and consolidated services, and greatly enhanced reliability and transparency of government as new advanced ICT evolves (e.g. m-government and u-government).

ANNEX

Further Reading

Asia-Pacific Development Information Programme. e-Government Case Studies. UNDP.
<http://www.apdip.net/projects/e-government/capblg/casestudies>.

Asian Development Bank. ICT Project Guidebook: Improving Public Services through Information & Communication Technology. Project Number: RETA 7351, 2010.

BAH (Booz/Allen/Hamilton). Beyond e-Government: The world's most successful technology-enabled transformations. A study commissioned by UK Cabinet Office, 2005.
<http://www.boozallen.com/media/file/151607.pdf>.

Commonwealth of Australia. Demand and Value Assessment Methodology. 2004.
http://www.agimo.gov.au/archive/__data/assets/pdf_file/0004/52438/DAM__and__VAM_Manual.pdf.

Economic and Social Commission for Asia and the Pacific. *e-Health in Asia and the Pacific: Challenges and Opportunities*. Bangkok: United Nations. <http://www.unescap.org/esid/hds/lastestadd/eHealthReport.pdf>.

European Commission. eGovernment Economics Project (eGEP). 2006. <http://www.epractice.eu/files/media/media1299.pdf>.

HM Treasury. THE GREEN BOOK: Appraisal and Evaluation in Central Government. 2003.
http://www.hm-treasury.gov.uk/d/green_book_complete.pdf

Holzer, Marc, and Seang-Tae Kim. *Digital Governance in Municipalities Worldwide (2007): A Longitudinal Assessment of Municipal Websites Throughout the World*. New Jersey: National Center for Public Performance, 2008. <http://www.unpan.org/Library/MajorPublications/DigitalGovernanceinMunicipalitiesWorldwide/tabid/804/Default.aspx>.

Institute for Development Policy and Management. Development Informatics: Working Papers. University of Manchester.
<http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/index.htm>.

Institute for Development Policy and Management. iGovernment - Information Systems, Technology and Government: Working Papers. University of Manchester.
<http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/index.htm>.

ITU. e-Government Implementation Toolkit. 2009.
<http://www.itu.int/ITU-D/cyb/app/docs/eGovernment%20toolkitFINAL.pdf>.

National Institute for Smart Government (NISG). E-Governance Assessment Frameworks (EAF Version 2.0). 2004.
<http://www.iimahd.ernet.in/egov/documents/assessment-frameworks.pdf>.

OECD. The e-Government Imperative. OECD e-Government Studies. Paris, 2003. <http://pavroz.ru/dov/egovimperative.pdf>.

UNESCO. E-Government Toolkit for Developing Countries. Asia-Pacific Bureau for Communication and Information. New Delhi, India, 2005.
<http://unesdoc.unesco.org/images/0013/001394/139418e.pdf>.

United Nations Department of Economic and Social Affairs. *United Nations e-Government Survey 2010: Leveraging e-government at a time of financial and economic crisis*. New York: United Nations, 2010. http://www2.unpan.org/egovkb/documents/2010/E_Gov_2010_Complete.pdf.

_____. *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>.

Wattegama, Chanuka. *ICT for Disaster Management*. Bangkok: UNDP and Incheon: UN-APCICT, 2007.

World Bank. e-Government Primer. 2009. www.infodev.org/en/Document.823.pdf.

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	Buying and selling of products or services over electronic systems such as the Internet and other computer networks. It also includes the entire online process of developing, marketing, selling, delivering, servicing and paying for products and services. The amount of trade conducted electronically has grown extraordinarily with widespread Internet usage. While some use e-commerce and e-business interchangeably, they are distinct concepts. In e-commerce, ICT is used in inter-business or inter-organizational transactions (B2B) and in business-to-consumer transactions (B2C). In e-business, on the other hand, ICT is used to enhance one's business.
e-Government	The process of restructuring internal government processes and improving information exchange systems between various government institutions with the use of ICTs. The purpose of e-government is more effective and efficient delivery of government services to citizens and businesses. While some use e-government and e-governance interchangeably, they are distinct concepts.
e-Health	The umbrella term that includes all aspects of ICT use in health care. E-Health includes telemedicine, where medical advice or consultation is provided over long distances via Internet, radio, telephone or other communication technologies. E-Health also refers to the use of ICT for dissemination of health-related information, such as HIV/AIDS and vaccination hubs, using radio, television, Internet or short message service (SMS). Moreover, e-health is used in hospitals for management, medical data collection or statistical purposes.
e-Learning	An umbrella term for all forms of electronically supported learning and teaching. It encompasses learning at all levels, both formal and non-formal. The information and communication systems, whether networked learning or not, serve as specific media to implement the learning process. E-learning encompasses using ICT for learning at all levels, both formal and non-formal, in-classroom and out-of-the-classroom, whether wholly or in part, for course delivery, interaction, evaluation and/or facilitation. E-learning applications and processes include web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.
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 of mobile technologies by governments to interact with their citizens. For example, a mass alert can be sent out as an SMS message in the event of an emergency. This is different from e-government, which delivers services over a variety of platforms and mediums, not specifically through mobile communication devices such as mobile phones, personal digital assistants (PDAs) and laptops.
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 TV.
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. A set of “Test Yourself” questions is also provided. 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 road map 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 Authors

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UN-APCICT/ESCAP

The United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (UN-APCICT/ESCAP) is a subsidiary body of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). UN-APCICT/ESCAP 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/ESCAP'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/ESCAP 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 nine 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 currently 10 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. Below are the short descriptions of the 10 modules of the *Academy*.

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 MDGs.

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 - Information Security and Privacy

Presents information on 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.

Module 9 - ICT for Disaster Risk Management

Provides an overview of disaster risk management and its information needs while identifying the technology available to reduce disaster risks and respond to disasters.

Module 10 - ICT, Climate Change and Green Growth

Presents the role that ICTs play in observing and monitoring the environment, sharing information, mobilizing action, promoting environmental sustainability and abating climate change.

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. To ensure that the programme stays relevant and addresses emerging trends in the ICTD, APCICT regularly revises the modules and develops new modules.

APCICT Virtual Academy (<http://e-learning.unapcict.org>)

The APCICT Virtual Academy is part of the multi-channel delivery mechanism that APCICT employs in the implementation of its flagship ICTD capacity building programme, the *Academy of ICT Essentials for Government Leaders*.

The APCICT Virtual Academy allows learners to access online courses designed to enhance their knowledge in a number of key areas of ICTD including utilizing the potential of ICTs for reaching out to remote communities, increasing access to information, improving delivery of services, promoting lifelong learning, and ultimately, bridging the digital divide and achieving the MDGs.

All APCICT Virtual Academy courses are characterized by easy-to-follow virtual lectures and quizzes, and users are rewarded with APCICT's certificate of participation upon successful completion of the courses. All *Academy* modules in English and localized versions in Bahasa and Russian are available via the Internet. In addition, plans for more content development and further localization are underway.

e-Collaborative Hub (<http://www.unapcict.org/ecohub>)

The e-Collaborative Hub (e-Co Hub) is APCICT's dedicated online platform for knowledge sharing on ICTD. It aims to enhance the learning and training experience by providing easy access to relevant resources, and by making available an interactive space for sharing best practices and lessons on ICTD. e-Co Hub provides:

- A resources portal and knowledge sharing network for ICTD
- Easy access to resources by module
- Opportunities to 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