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CURRENT PRACTICES OF LEADING E-GOVERNMENT COUNTRIES

IT is transforming the way governments function and valuable lessons can be learned from the pioneering e-government programs that have led the charge.

The pervasive adoption of the Internet since the 1990s has stimulated businesses to embrace e-commerce. In the public sector, e-government has emerged and grown enormously as well. Indeed, the development of e-government has clearly mirrored the development of e-commerce.

The core concepts and techniques of putting government online first emerged in the most technologically advanced Western countries, which were pioneers in the adoption of the Internet [2]. In the mid-1990s, the governments of the U.S. and Britain, together with other Western countries such as Canada and Australia, led the way in establishing a basic informational Web presence. Since then, public organizations across the globe and at different governmental levels have been applying Internet technologies in innovative ways to deliver services, engage citizens, and improve performance. Today, the Internet is ubiquitous in the developed world, and developed countries are leading the global phenomenon of e-government.

Most of the existing literature on e-government is based on surveys and case studies, reporting many innovative practices and also some spectacular failures. These studies, especially *Communications'* January 2003 sec-

tion on digital government [8], offer valuable findings and insights. Here, we provide a broad overview of the current practices of leading e-government countries and present possible future directions.

E-GOVERNMENT CATEGORIZATION AND PROGRESS

Since the advent of the Internet, government agencies, management consulting firms, and IT companies have led the way in not only exploring e-government initiatives, but also documenting best practices. Academic researchers have conducted case studies and surveys to support the development of e-government. Both streams of literature are useful in understanding the development of e-government and supporting government agencies in their strategic planning of e-government initiatives.

E-government is mainly concerned with providing quality public services and value-added information to

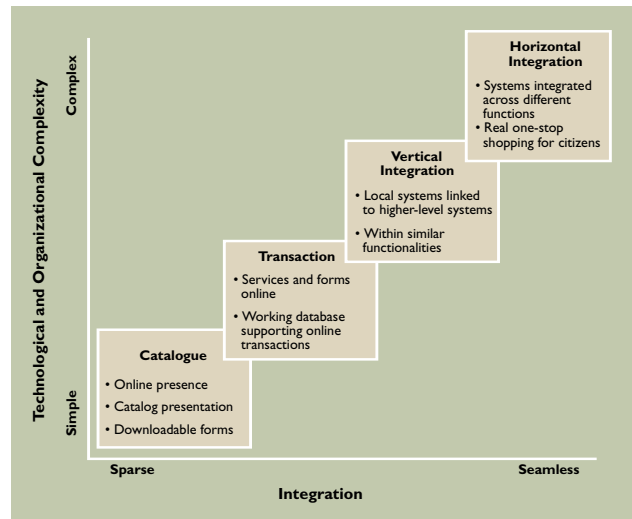
citizens. It has the potential to build better relationships between government and the public by making interactions between citizens and government agencies smoother, easier, and more efficient. In this respect, e-government serves a similar purpose to customer relationship management (CRM) in the business world.

Existing e-government offerings actually go beyond merely facilitating or transforming the interaction between government and individual citizens. E-government serves a variety of other actors. For instance, some e-government initiatives aim at enabling government agencies to more efficiently work together and provide one-stop service to citizens and businesses. Such practices are somewhat analogous to supply chain management (SCM) in the business world, which stresses coordination and collaboration among supply chain partners. There are also e-government initiatives that focus on the internal efficiency and effectiveness of operations, resembling enterprise resource planning (ERP). Other e-government initiatives are intended to produce an overarching infrastructure to enable interoperability across different e-government practices, akin to the efforts of enterprise application integration practiced by businesses.

By combining the findings from other e-government-related publications and current practices of leading e-government countries, we present the categorization of e-government practices in Table 1. Figure 1 depicts the evolutionary progression of e-government, which consists of four stages [6]: cataloging, transaction, vertical integration, and horizontal integration. E-government progress does not necessarily follow a linear path. Government agencies may skip over certain stages or offer services from different stages simultaneously in a single initiative. For instance, the U.S. Integrated Acquisition Environment (IAE) is an e-government initiative that encompasses transaction, vertical integration, and horizontal integration.

E-GOVERNMENT PRACTICES IN LEADING COUNTRIES

Much of the existing e-government literature focuses on a particular layer of government, for example, the federal government in the U.S. or local government in the European countries. In addition, there are few cross-national comparisons of e-government practices. Here, we provide a concise review of current practices in the leading e-government countries, namely the

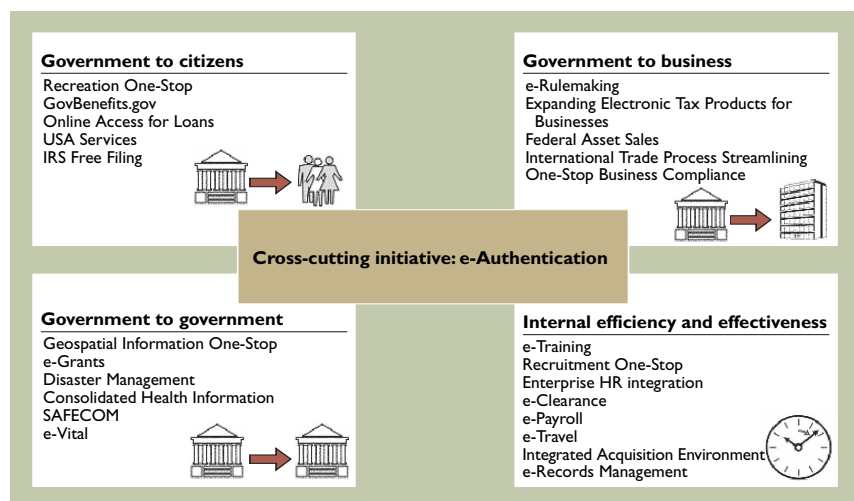


Source: Adapted from [6].

Figure 1. Dimensions and stages of e-government development.

U.S., the European Union, and some advanced e-government countries in Asia. We chose these three regions because they have been leading the way with e-government initiatives, and developing countries are following their best practices.

The U.S. has been leading the e-government development since the Clinton administration in the 1990s.



Source: GAO. Icons by Nova Development Corporation.

Figure 2. OMB's 25 e-government initiatives.

A 2004 United Nations report rated the U.S. the world leader in e-government [10]. Accenture has ranked the U.S. among the innovative leaders in its comprehensive report on the global e-government leadership for three consecutive years since 2001.

At the federal level, an evolving framework of laws and policies has been influencing the speed, scope, and direction of e-government initiatives in the U.S. [12]. Some influential statutes include the Government Per-

Table 1. E-government practice categories.

E-government category	Business metaphor	Description	Sub-category	Example practice
Government to citizens (G2C)	Customer Relationship Management (CRM)	Providing opportunities for greater citizen access to and interaction with the government	Managerial interaction	Government's informational Web sites
			Consultative interaction	E-voting, instant opinion polling
Government to businesses (G2B)		Seeking to more effectively work with businesses	Businesses as suppliers of goods or services	Government's e-procurement
			Businesses as regulated economic sectors	Electronic filing with various government agencies
Government to government (G2G)	Supply Chain Management (SCM)	Enabling government agencies at different levels to work more easily together	Vertical integration	Sharing a database among agencies within the similar functional walls but across different levels of government
			Horizontal integration	Sharing a database among agencies at the similar levels of government but across different functions
Government internal efficiency and effectiveness (IEE)	Enterprise Resource Planning (ERP)	Focusing on internal efficiency and effectiveness	Government to employee	Web-based payroll/health benefits system
			Integrating internal systems	Implementing ERP-like systems to integrate different functions within a single agency
Overarching infrastructure (Cross-cutting)	Enterprise Application Integration (EAI)	Facilitating the interoperability across different practices	Hardware and software interoperability	Public-key Infrastructure interoperability
			Authentication	e-Authentication across different e-government initiatives

formance Results Act of 1993, Clinger-Cohen Act of 1996, Government Paperwork Elimination Act of 1998, and E-Government Act of 2002. Indeed, the government's effort to protect the public has been a top priority in the wake of the terrorist attacks on Sept. 11, 2001. Title VII of the U.S. Patriot Act of 2001 requires public agencies to share information to protect the nation's critical infrastructure.

The E-Government Act of 2002 includes provisions addressing everything from the funding of e-government initiatives to measures for ensuring security and privacy. The Act established a Federal Chief Information Office within the Office of Management and Budget (OMB) to plan an e-government strategy and oversee the implementation of e-government initiatives. In October 2002, the OMB released the E-Government Strategy, an action plan including 25 initiatives, as shown in Figure 2, for implementing President Bush's initiative to expand e-government. The government announced newer e-government strategies to implement these initiatives in April 2003.

At the state level, the adoption of e-government is unbalanced. Some states have embraced e-government more extensively than others. The most respected e-government study in the U.S., the Digital States Survey by the Center for Digital Government, examines distinct sectors of e-government in all 50 states. Key sectors include social services, digital democracy, e-commerce, taxation, and revenue. Arizona, Michigan, and Washington are recognized as the leaders in providing e-government services in the latest survey [1].

While local governments (cities and counties) are increasingly adopting e-government practices, local e-government is still at an early development stage and has yet to achieve many of the promised outcomes. Top online services include paying parking tickets or traffic fines, complaint filing, and service requests. The annual Digital Cities Survey and Digital Counties Survey [1] not only rank e-government applications, but also present the best-of-breed programs to promote e-govern-

Action	Actor (s)	Deadline	E-government category	Sub-category
Essential public data online including legal, administrative, cultural, environmental, and traffic information.	Member States, supported by European Commission	end of 2002	G2C	Managerial interaction
Member States to ensure generalized electronic access to basic public services.	Member States	end of 2002/3	N/A	
Simplified online administrative procedures for business, such as fast-track procedures to set up a company.	Member States, European Commission	end of 2002	G2B	Businesses as regulated economic sectors
Develop a coordinated approach for public sector information, including at the European level.	European Commission	end of 2000	G2G	Horizontal integration
Promote the use of open source software in the public sector and e-government best practices through exchange of experiences across the Union (through the IST and IDA programs).	European Commission, Member States	during 2001	Cross-cutting	Hardware and software standardization
All basic transactions with the European Commission must be available online (funding, research contracts, recruitment, and procurement).	European Commission	end of 2001	IEE	Government to employee
			G2B	Businesses as suppliers
Promote the use of electronic signatures within the public sector.	Member States, European Institutions	end of 2001	Cross-cutting	Authentication across platforms

Table 2. Government Online eEurope Action Plan 2002.

ment adoption by local governments.

The European Union. The nations in the EU have been making e-government a major administrative and political priority since the 1990s. While North America undoubtedly led the way in e-government, European countries were ranked second among all the geographic regions in a UN report [10]. In particular, EU member nations received high rankings in the 2004 e-government readiness index among all the UN member states: Denmark (2), the United Kingdom (3), Sweden (4), Finland (9), the Netherlands (11), Germany (12), Belgium (16), Austria (17), Ireland (19), France (24), Luxembourg (25), Italy (26), Portugal (31), Spain (34), and Greece (36). Some EU member nations, such as Belgium, Denmark, Finland, France, Germany, Ireland,

Country or region	Examples of e-government practices by category				
	G2C	G2B	G2G	IEE	Cross-cutting
The U.S.	GovBenefits.gov: providing a single point of access for citizens to locate and determine potential eligibility for government benefits and services.	Federal Asset Sales: creating a single, one-stop access point for businesses to find and buy government assets.	e-Grants: providing a single, online portal for all federal grant customers to access and apply for grants.	Government Human Resource Integration: streamlining and automating the exchange of federal employee human resources information.	The e-Authentication project: providing a secure infrastructure for online transactions.
The European Union	Single Point of Access for Citizens of Europe (an EU-project): supporting citizens' travel within Europe.	The Net-Enterprises Project (France): allowing enterprises, through Internet, to send standardized notifications to government agencies.	Interchange of data between administrations (the IDA program): networking of public administrative units.	Government Secure Intranet (UK): a governmentwide communications infrastructure for joined-up government.	IDA e-Link: a communication middleware solution to enable reliable and secure information exchanges among administrative units across Europe.
Singapore	eCitizen Portal: providing a single access point to government information and services, which are organized and integrated in intuitive categories.	G2B Portal: the entry point for all local and international businesses to access a full suite of aggregated and integrated G2B information and services.	GeBIZ Enterprise: coordinating the purchasing needs of the public sector procurement officers.	InfoComm Education Programme (IEP): facilitating learning and enabling public officers to appreciate and work toward the objective of a "Networked Government."	Singapore Personal Access (SingPass): a nationwide personal authentication framework for e-services.
South Korea	Home Tax Service (HTS) via the Internet: providing 24/7 online service such as tax declaration and payment.	Integrated e-Procurement System: a single procurement window, allowing all procurement related processes electronic.	Integrated National Finance Management System: a system for information sharing and linkage for finance related institutions.	Integrated Administration Information System in Local Government: promoting the application of information systems for all administrative affairs.	Government e-Signature & e-Seal System: securing reliability for information distribution and e-administration such as private information protection and security.
Taiwan	Online motor vehicle services system: providing 21 applications and payment services to individual citizens.	Government Procurement Information Center: enabling government procurement with businesses much more transparent and efficient.	Interdepartmental E-mail Delivery infrastructure: delivering official messages via electronic delivery systems not bound by time and geographical constraints.	Online Central Personnel Administration: improving the administrative efficiency in government human resource management.	Government Root Certification Authority (GRCA): providing the public, businesses, and government agencies with secure and error-free means of making online applications and transmitting data.

Table 3. Examples of e-government practices among the select leading countries.

ment in the EU.

The EC has been using competition to accelerate the adoption of e-government by member nations. The EC's Information Society Office created the e-Europe benchmarking program to assess differences among the member nations in the adoption of new technologies. E-government is among the 23 key indicators [5]. In addition, a competition for the e-Europe Award for Innovation in e-Government was created at the ministerial conference three years ago in Como, Italy.

Various e-government benchmarking reports reveal some features of the current development of e-government among EU member nations:

- E-government has made significant progress in the last few years, especially in the form of portal-based Web sites that provide citizens and firms with access to public administration and services.
- The integration and collaboration of e-government initiatives have not been sufficiently addressed. The e-government indicator of existing eEurope benchmarking programs focuses solely on government Web sites such as government-to-citizen (G2C) and government-to-business (G2B) portals.
- E-government development is heterogeneous among EU member nations, while there is some recent convergence at the EU level in the prioritization of initiatives and development strategies. There is a big gap between the current 15 EU members and the 10 new members.
- There appears to be a lack of coordination in legislation among the EU member states.

ASIAN E-GOVERNMENT LEADERS

In the UN's e-government report [10], Southern and Eastern Asia was ranked third in the regional comparison, behind North America and Europe. Some individual Asian counties received high rankings in the 2004 E-government Readiness Index, notably the Republic of Korea (5), Singapore (8), and Japan (18). Other e-government surveys and reports, such as Accenture's e-government leadership reports and

Italy, Netherlands, and U.K., also ranked relatively high in recent Accenture reports. Accenture put EU member nations in either the Visionary Followers or Steady Achievers group, while Canada, Singapore, and the U.S. were in the Innovative Leaders category.

The primary initiators of e-government programs in the EU were the European Commission (EC) and the Information Society Project Office [2]. In December 1999, the EC launched the eEurope initiative to spread the benefits of information society to all Europeans. In the published initiative [3], supporting e-government (government online) is one of the primary goals. Prodded by the EC, the EU's Council of Ministers approved the eEurope 2002 Action Plan in June 2000. The eEurope 2002 Action Plan provides a detailed description of actions to be undertaken, main players involved, and timing. Table 2 depicts the related actions for supporting e-government. The EC's e-government initiatives are not as ambitious as its U.S. counterpart's. In particular, the Action Plan 2002 does not address consultative interaction between government and citizens, such as e-voting, or the integration of the government's internal systems. In June 2002, eEurope 2005 Action Plan was launched to succeed the eEurope 2002 Action Plan. However, it does not provide specific action plans for e-government initiatives. Therefore, the 2002 Action Plan is still the de facto guideline for e-government develop-

West's global e-government report [11], also gave high marks to some developed countries in Asia for their e-government development. These Asian countries do not seek to follow a single path in developing e-government practices.

Singapore has ranked second in Accenture's surveys for three consecutive years, labeled as an Innovative Leader. It ranked eighth in the UN's benchmarking report [10]. Singapore's e-government initiatives started as early as 1980, with the launch of the Civil Service Computerisation Programme (CSCP). The first e-Government Action Plan (2000–2003) replaced the CSCP in 2000. The vision of the e-Government Action Plan was "to be a leading e-Government to better serve Singapore and Singaporeans in the new knowledge-based economy" [4]; \$1.5 billion (US\$900 million) was committed to this plan. The plan prescribes the six programs: Knowledge-based workplaces; e-service delivery; technological experimentation; operational efficiency improvement; an adaptive and robust information and communications infrastructure; and information and communications education.

The first e-Government Action Plan provided a strong foundation for the implementation of the second Plan, "e-Government Action Plan II (2003–2006)," which aims to achieve three distinct outcomes: delighted customers, connected citizens, and networked government.

The e-government action plans are explicitly centered on three critical relationship dynamics—G2C, G2B, and G2G. Internal efficiency and effectiveness (IEE) and cross-cutting are implicitly addressed in the implementation of these programs. The Ministry of Finance oversees the overall e-government initiative, while e-government policy and direction are centrally coordinated by a high-level e-Government Policy Committee. Built on a solid platform, including advanced IT infrastructure and a supportive legal framework, Singapore's e-government practices have steadily grown in number and sophistication.

South Korea. In 1987, the Korean government began initiatives to establish a national computing backbone and to consolidate key databases. As early as the 1990s, Koreans were able to enjoy a number of online services, including registering births and finding new economic statistics. The Korean government invested \$5 billion in information and communication technology (ICT) from 1996 to 2001. Today, Korea leads the world in the percentage of households connected to high-speed Internet (over 70%), mobile communication users (over 72%), and the rate of ICT diffusion [7]. Following the development of an IT infrastructure, the Korean government launched an e-Government Special Committee and drafted an e-Government Law in early

2001. The Committee named 11 key tasks in the "Strategy Report Committee for e-Government" in May 2001:

INNOVATIVE AND IMPROVED SERVICES: PUBLIC AND BUSINESSES

- Public-oriented service through a single window
- Linking four major social insurance information systems
- Home Tax Service (HTS) via the Internet
- G2B: An integrated e-procurement system

PRODUCTIVITY AND EFFICIENCY: GOVERNMENT

- An integrated national finance management system
- Integrated administration information systems in local governments
- A nationwide education administration information system
- A personnel policy management system
- Government e-document exchange

BUILDING AN INFRASTRUCTURE FOR E-GOVERNMENT

- A government e-signature and e-seal system
- Consolidation of government computing centers

These key tasks cover most current e-government practices: G2C, G2B, G2G, IEE, and cross-cutting. With a strategy, Korea has made perhaps the most dramatic advances in its e-government program, thus ensuring the second place in West's report [11].

Taiwan was rated as the best among the 198 nations and regions in West's report [11]. Even though this report is limited to the analysis of e-government features available online at national government Web sites, Taiwan's top ranking reflects its significant progress in e-government. Taiwan's e-government development was primarily guided by the "Electronic Government Program (2001–2004)," passed by the executive branch of the Taiwan government in April 2001. The objectives of the program include:

- To provide online services to all agencies and civil servants via the government service network.
- To encourage the government work force at all organizational levels to take advantage of the Internet to conduct administrative business and provide public service more efficiently.
- To promote communication and document interchange between organizations at different levels by implementing an electronic document exchange and gateway system.
- To improve the convenience and efficiency of government services and extend the spatial and temporal coverage of government services by providing 1,500 Internet-based application services and one-stop processing services.

Some practices of G2C, G2B, G2G, and IEE are clearly addressed in this program. In addition, electronic certification services for e-government have been implemented through a Public Key Infrastructure and a Privilege Management Infrastructure. The Information Management Department oversees and coordinates all the e-government initiatives. By the end of 2002, 97% of Taiwan government organizations were connected to the Internet, and 4,863 government agency Web sites had been established [9].

Based on an extensive review, Table 3 presents some specific examples of current e-government practices among the selected leading countries.

CONCLUSION

Based on the existing research and industry reports on e-government, we discussed categories of e-government practices and conducted a cross-national comparison of current e-government practices among the leading countries, particularly the U.S., the EU, and some advanced ICT countries in Asia. This study is a broad review of current practices and future plans of leading e-government countries. Thus, a detailed comparative analysis of specific categories, examples of success and failure, and associated ICT are not provided.

It appears evident that e-government practices mirror each country's ICT diffusion and government efforts toward political reform. There is incredible diversity in e-government programs and practices among nations, including within a geographic area or even an economic bloc such as the EU. However, it is clear that e-government efforts and best practices are most prevalent in North America, selected EU member nations in Western Europe, and several Asian ICT leading nations. While not discussed here, Australia and New Zealand are also making rapid progress in e-government. In most countries, advanced e-government activities are at the federal or national level, and local governments are generally at the early stage of e-government development.

Public organizations are facing challenges in expanding e-government programs, as the levels of adoption and sophistication of e-government practices vary greatly among governments, even among global e-government leaders. Some governments still lack the fundamental infrastructure, organizational culture, and resources required for the transformation of e-government. An effective e-government program requires successful and seamless integration of appropriate ICT, quality information, engaged public employees, good administrative processes, and government leadership. Otherwise, the existing bureaucracy and ineffective processes may only be exacerbated by leading-edge ICT.

Regardless of the state of each country's e-government efforts, e-government should be implemented, because advanced ICT provides enormous new opportunities to improve public services for citizens and to enhance the efficiency of government operations. The new advances in ICT, such as Very-high-bit-rate Digital Subscriber Line (VDSL) high-speed Internet, Virtual Division Multiple Access (VDMA) mobile communications, WiFi, and Next-Generation Network, will undoubtedly further enhance e-government activities through ubiquitous computing. **□**

REFERENCES

1. Center for Digital Government. *Digital State, Cities and Counties Survey*. 2002; www.centerdigitalgov.com/center/02digitalstates.php.
2. Chadwick, A. and May, C. Interaction between states and citizens in the age of the Internet: "e-Government" in the United States, Britain, and the European Union. *Governance: Int. J. Policy Admin. Institutions* 16, 2 (2003), 271–300.
3. European Commission. eEurope: An information society for all. *Communication on a Commission Initiative for the Special European Council of Lisbon* (Mar. 23–24, 2000); www.e-europestandards.org/Docs/eeurope_initiative.pdf.
4. Government Chief Information Office. *The e-Government Action Plan (2000–2003)*; www.egov.gov.sg/PlansandStrategies/e-Government-Plans/e-GovernmentActionPlan/.
5. Information Society Office. *List of eEurope Benchmarking Indicators*. 2000; europa.eu.int/idabc/en/document/3542/5662.
6. Layne, K. and Lee, J. Developing fully functional e-government: A four-stage model. *Gov. Inf. Q.* 18, 2 (2001), 122–136.
7. Lee, S. M. South Korea: From the land of morning calm to ICT hotbed. *Acad. Manage. Exec.* 17, 2 (2003), 7–18.
8. Marchionini, G., Samet, H., and Brandt, L., Eds. Digital government. *Commun. ACM* 46, 1 (Jan. 2003), 25–70.
9. Research, Development, and Evaluation Commission. *E-government Development in Taiwan*. 2003, ngo.cier.edu.tw/trio/tw_e-gov.pdf.
10. United Nations, Department of Economic and Social Affairs. *Global E-government Readiness Report 2004: Toward Access for Opportunity*, (2004); unpan1.un.org/intradoc/groups/public/documents/un/unpan019207.pdf.
11. West, D. *Global E-government Report: 2002*; www.insidepolitics.org/egovt02int.PDF.
12. Willemssen, J. Electronic government: Success of the Office of Management and Budget's 25 initiatives depends on effective management and oversight. Testimony before the Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, Committee on Government Reform, U.S. House of Representatives. 2003. GAO-03-495T.

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