Special Issue

Digital Government: technologies and practices

1. Introduction to the special issue

The Internet is changing the way we live and do business. It also offers a tremendous opportunity for government to better deliver its contents and services and interact with its many constituents—citizens, businesses, and other government partners. In addition to providing information, communication, and transaction services, exciting and innovative transformation could occur with the new technologies and practices.

1.1. NSF Digital Government Program

In 1998, the National Science Foundation in the US initiated its first program in Digital Government, according to the program announcement [6]:

> The Federal Government is a major user of information technologies, a collector and maintainer of very large data sets, and a provider of critical and often unique information services to individuals, states, businesses, and other customers. The goal of the Digital Government Program is to fund research at the intersection of the computer and information sciences research communities and the mid- to long-term research, development, and experimental deployment needs of the Federal information service communities. The Internet, which was created from a successful partnership between Government agencies and the information technologies research community, is a major motivating factor and context for this program. The coming decade will see the potential for nearly ubiquitous access to government information services by citizen/customers using highly capable digital information/entertainment appliances. Given the inexorable progress toward faster computer microprocessors, greater network bandwidth, and expanded storage and computing power at the desktop, citizens will expect a government that responds quickly and accurately while ensuring privacy. Enhancements derived from new information technology-based services can be expected to contribute to reinvented and economical government services, and more productive government employees. As society relies more and more on network technologies, it is essential that the Federal Government make the most effective use of these improvements.

Through several rounds of solicitation and funding since 1998, NSF has funded a number of digital government projects that aimed at areas such as [1,2,5]:

- Supporting information sharing and knowledge management for law enforcement,
- Improving citizen access to government statistical data,
- Designing high-speed communications for comprehensive emergency management, and
- Ensuring security for web-based statistical analysis of confidential data.

In order to facilitate exchanges between information technology researchers and various Federal, state, and local government partners, NSF has supported the creation of the Digital Government Research Center (DGRC). In addition, an annual NSF-sponsored Digital Government Conference helps bring researchers and government partners together for active exchange of research results and collaborative projects (http://www.dgrc.org/dgo2002).

1.2. E-government program in the European Union

In the EU, many e-government (i.e., digital government) initiatives are under way. These programs vary widely and include areas such as [3]:

- Online public service and one-stop shopping for information content,
- E-politics, e-democracy, e-voting,
- Transactions, security, and digital signatures for e-government, and
- Business and political issues of relevance to e-government.

Many successful and ongoing e-government initiatives have also emerged in Asia and Pan-Pacific countries such as: China, Singapore, Japan, Korea, Taiwan, India, New Zealand, Australia, etc. E-government projects in Latin American countries have also been reported. Most, however, are moving gradually upward along the information–communication–transaction–transformation continuum.

1.3. The information–communication–transaction–transformation (ICTT) continuum

Internet delivers government content and services with different levels of interaction [2,4].

• At the lowest level, government "information" is created, categorized, and indexed and delivered to its citizens through the Internet. Research problems at this level are similar to those of digital libraries or Internet search engines—primarily for information seeking. Metadata, data consolidation, content quality, and system interfaces are the most critical issues under consideration. Most early G2C (government-to-citizen) and G2B (government-to-business) services belong to this category, in which governments merely act as information providers and do not provide a two-way communication channel connecting them with citizens or businesses.

• At the next level, e-government services support two-way "communication," whereby citizens can communicate their needs or requests through web forms, email, or other Internet media. Many early G2C and G2B applications quickly evolved into providers of such communication services, by adding simple groupware functionalities such as web forms, email, bulletin boards, chat rooms, etc.

• At the third level, "transaction" services for citizens and businesses are supported. In addition, government branches also use the Internet for transactions among themselves. Many of the more advanced G2C, G2B, and G2G applications belong to this category. Income tax filing, withholding, and returns (for citizens and businesses), municipal service requests and tracking, business license applications and payments, etc., constitute e-government transactions that can be conducted over the Internet.

• At the fourth and highest level, we believe there is an opportunity for the "transformation" of practices and services delivered from the government agencies to their constituents. E-voting and e-politics are examples of e-government applications that may significantly alter the conducting of democratic voting and political processes. In the law enforcement and litigation support area, new database and data mining technologies could become the catalyst for encouraging information sharing and supporting collaboration and investigation among police departments, corrections offices, social services, and courts, which previously have been difficult to conduct [5].

1.4. E-commerce vs. e-government

Despite similar reliance on Internet technologies and the need to progress along the ICTT continuum, e-government faces some issues and challenges uniquely different from those of e-commerce. Gordon [4] made a clear distinction between e-commerce and e-government:

> …But e-commerce is not at the heart of e-government. The core task of government is governance, the job of regulating society, not marketing and sales. In modern democracies, responsibility and power for regulation is divided up and shared among the legislative, executive and judicial branches of government. Simplifying somewhat, the legislative is responsible for making policy in the form of laws, the executive for implementing the policy and law enforcement, and the judiciary for resolving legal conflicts. E-government is about moving the work of all of

these branches, not just public administration in the narrow sense.

1.5. Digital Government challenges

In addition to having different roles in government, digital government applications also face some unique challenges that are different from those of e-commerce.

• Organizational and cultural inertia: Most government entities are not known for their efficiency or willingness to adopt changes. Organizational bureaucracy and lack of clear communication channels or collaboration culture are some of the difficult problems to resolve before any e-government initiatives can become successful. Some (federal, state, and local) government agencies or departments are known for being non-responsive, closed, secretive, arrogant, bureaucratic, and resistant-to-change. Organizational and cultural changes often are more difficult than technological changes.

• Government and legal regulations: Government at all levels are often faced with numerous laws and regulations intended to make their rights and obligations clear and provide some supervisory and/or balancing functions. Although well-intended, such laws and regulations often inhibit innovation or thinking "out-of-the-box."

• Security and privacy: E-government applications on the Internet face the daunting task of protecting the privacy of citizens (and their transactions) in an open (and often not-so-secure) Internet environment. Although e-commerce applications may also stress security and privacy issues (e.g., for credit transactions and customer information), government-provided services have an extra burden of guaranteeing security and privacy for citizens. Many digital government projects are currently under way to explore public key encryption and digital signature issues unique to e-government.

• Disparate and out-dated information infrastructure and systems: Many government departments at all levels often face budget shortfalls for years. As a result, their information infrastructure and systems may be out-of-date. Mainframe computers and applications of the 1970s may constitute a significant part of their computing infrastructure. Some applications may be LAN- or Windows-based (technology choice

of the 1980s), but most are not Web-enabled or Internet-based. Different departments often purchase their own computers and software at different times based on their immediate needs. As a result, disparate legacy, "stovepipe" systems are created, which prevent departments from sharing information and/or streamlining their businesses.

• Lack of IT funding and personnel: Some government units (local, state, and federal) are affluent, but most are not. IT spending often is not a priority (e.g., in light of the more visible or pressing need to put cops on the street, or to purchase additional fire trucks for an under-served community). Furthermore, IT personnel in government often lack resources for training and re-education to update their technical skills. The Internet e-commerce boom (and resulting brain drain) over the past decade also has accelerated the recruitment and retention problem for government IT divisions.

1.6. Digital Government (DG) research directions

From such unique and pressing challenges, many interesting digital library research topics have emerged. These include, but are not limited to, the following:

• Information technologies and systems that support DG activities,
• Case studies of successful DG implementations,
• Effective DG dissemination techniques and best practices,
• Intelligent or innovative presentation of DG content or decision support for DG services, and
• Policy, legal, and organizational issues of relevance to DG.

1.7. In this issue

This special issue consists of seven papers that report research in digital government. These case studies range from local to federal government applications, and from successful US initiatives to innovative programs in Asia and Europe.

The first paper, "Evolutionary Development and Research for an Internet-based Collaborative Writing Tool to Enhance eWriting in an E-government Setting," by Lowry, Albrecht, Nunamaker, and Lee, details the years of evolutionary development and

research conducted by the Center for the Management of Information (CMI) in an e-government setting that resulted in the creation of an Internet-based collaborative writing (eWriting) tool, called Collaboratus. Their research shows the promising potential for Collaboratus and eWriting tools to help improve digital government through improved document production and collaboration. The second paper, "Structural Analysis of E-government Initiatives: A Case Study of SCO," by Devadoss, Pan, and Huang, shows how a government agency developed and implemented an e-procurement system. In particular, the study suggests that in the initial stage of any e-government projects, having the support of computer-mediated cooperation would be useful as it provides a holistic view. The third paper, "COPLINK Connect: Information and Knowledge Management for Law Enforcement," by Chen, Schroeder, Hauck, Ridgeway, Atabakhsh, Gupta, Boarman, Rasmussen, and Clements, addresses the law enforcement information sharing problem by providing an easy-to-use web interface that integrates disparate data sources. Careful user evaluations allowed the researchers to study the impact of COPLINK on law enforcement personnel as well as to identify requirements for improving the system. The fourth paper, "Intelligence Delivery of Military Lessons Learned," by Weber and Aha, describes the monitored distribution approach for the active delivery of lessons learned. Their results showed that this just-in-time information delivery approach, embedded in a decision support system for plan authoring, significantly improved plan execution performance. The fifth paper, "Technology Push, Legislation Pull? E-Government in the European Union," by Strejcek and Theil, assesses the status quo of e-government in the European Union and explains the current problems of missing coordination in legislature. The sixth paper, "Using Group Support Systems for Strategic Planning with

the United States Air Force," by Adkins, Burgoon, and Nunamaker, investigates the effects of a facilitator's using technology to structure verbal and electronic communication, with the goal of increasing quality output and improving group member satisfaction. The project was completed at Mountain Home Air Force Base with the support of the 336th Wing. The seventh and last paper, "Using Knowledge Management to Reform the Russian Criminal Procedures Codex," by McHenry, examines Sense-Viewer, its relationship to rapid knowledge construction and its use to support the drafting and passing of a new Russian Criminal Procedural Codex. The paper considers what set of KM functions and tools are needed to facilitate the legislative process and disseminate knowledge to the populace.

We hope this collection of research papers will help advance our knowledge and understanding of this fascinating and evolving field of digital government.

References

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Dr. Hsinchun Chen is a McClelland Endowed Professor of MIS at The University of Arizona (fourth-ranked in the field of MIS according to the US World and News Report). He received the Ph.D. degree in Information Systems from New York University in 1989. He is the author of more than 100 articles covering medical informatics, semantic retrieval, search algorithms, knowledge discovery, and collaborative computing in leading information technology publications. He serves on the editorial board of *Journal of the American Society for Information Science and Technology* and *Decision Support Systems*. Dr. Chen founded The University of Arizona Artificial Intelligence Lab in 1990. As a major research group within the university, the Artificial Intelligence Lab employs over 40 staff, research scientists, research assistants, and programmers and has made a significant contribution to the research and educational experience of students at all levels in the MIS Department of The University of Arizona. Since 1990, Dr. Chen has received more than $12 million in research funding from various government agencies and major corporations including NSF, DARPA, NIJ, NIH, NLM, NCI, HP, SAP, 3COM, and AT&T. Dr. Chen is the Founding Director of The University of Arizona Mark and Susan Hoffman E-Commerce Lab (October 2000), which features state-of-the-art hardware and software in a cutting-edge e-commerce and enterprise computing research and education environment. Dr. Chen is also the founder of a knowledge management technology and service company—Knowledge Computing, a University of Arizona spin-off company. The company, which is Tucson-based, had received major venture capital funding and is growing rapidly in the law enforcement and market portal sectors. Dr. Chen's work also has been recognized by major US corporations for his contribution to IT education and research. In 1995 and 1996, he received the AT&T Foundation Award in Science and Engineering. In 1998, he received the SAP Award in Research/Applications and became the Karl Eller Center Honored Entrepreneurial Fellow. In 1999, Dr. Chen received the McClelland Endowed Professorship and the Andersen Consulting Professor of the Year Award. In 2000, he received the Kalt Prize for Doctoral Placement. Dr. Chen has been heavily involved in fostering digital library and knowledge management research and education in the US and internationally. He was a PI of the NSF-funded Digital Library Initiative-1 project and he has continued to receive major NSF awards from the ongoing Digital Library Initiative-2, ITR, and Digital Government programs. He also helped organize and promote the Asian digital library research community and has served as either the conference general chair or international program committee chair for five International Conferences of Asian Digital Libraries (ICADL, in Hong Kong in 1998, in Taipei, Taiwan, in 1999, in Seoul, South Korea, in 2000, in Bangalore, India, in December 2001, and in Singapore in 2002). Dr. Chen has frequently served as a panel member and/or workshop organizer for major NSF research programs. Dr. Chen is also a recognized advisor for international IT research programs in Hong Kong, China, Taiwan, Korea, and Ireland.

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