Public Information Technology

G. David Garson and Mehdi Khosrow-Pour   Volume II

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Volume I

Section I
E-Government and E-Commerce

Chapter I

This chapter examines the impact of e-government on public administration from both the constituent and service perspectives. The chapter presents a holistic view of both challenges and advantages of implementing e-government in the area of public administration.

Chapter II

In countries around the globe, the public availability of information through technologies, such as the Internet, has increased the average citizen's ability to access documents, resources and solutions with unprecedented ease. As a result, governments must adapt their systems and Internet-based or electronic communication to offer the most relevant services to their citizenry. In this chapter, we employ a legal perspective to examine the ramifications of public information strategies that allow firms to have hyperlinks embedded within the content of public information systems. This perspective allows the public information manager to make informed decisions when developing government portal strategies.

Chapter III

This chapter examines the advancement of e-government, primarily through the use of information and communication technologies (ICT). State and local governments are using ICTs in the creation of Web sites and portals, which provide information about the government agencies and, in some cases, electronic transactions such as tax payment systems, online communities, job search, licensing, and vehicle registration, among others. It is through these innovations that government systems are reaching a higher level of sophistication.

Chapter IV

This chapter reviews the opportunities and challenges of Internet-based citizen participation, the trend noted in the findings of some of the empirical studies and attempts to explain the reason the Internet has failed in its putative potential to bring citizens closer to their governments. The use of Internet technology to further citizen participation is believed to hold great promise to enhance democratic governance by allowing citizens to access public information and interact with government officials.

Chapter V

This chapter examines the advantages and challenges associated with open source software, particularly for public sector organizations. As new Internet-based products, services and resources are developed, private companies and government agencies are exploring the use of open standards and open source software for their daily operations. Advantages are discussed including interoperability and re-usability of code as well as data longevity. Challenges are discussed including technical training and support services as well as participation in online development communities and how this is constrained by the current legal framework and personnel practices.

Chapter VI

Researchers and practitioners use a wide range of terms when they discuss community involvement with information and communications technologies (ICT). Common (English-language) terms include 'community networks,' 'community computing,' 'community information networks,' 'civic networking,' 'community technology,' 'community computer networks,' 'online neighborhood network,' 'virtual community,' 'online community,' 'community e-business,' and most recently, 'community informatics.' Since at least the late 1990s, the term 'community informatics' has come into use amongst many academic researchers as an overarching label for the academic study of projects and initiatives which deliberately engage community groups and organizations with ICTs. However, community informatics has not yet achieved a stable set of findings or core questions which are commonly used to conduct research.

There exists a growing controversy over whether government should be in the business of providing wireless broadband Internet. Public sector entities, particularly counties and cities, are developing the physical and intellectual infrastructure designed to provide wireless broadband Internet to their residents. Opponents of government entry into the wireless broadband market argue that existing private broadband vendors are fully capable of providing wireless Internet in an efficient manner. Supporters argue that government is uniquely capable of building and supporting, at least initially, wireless broadband at a lower cost and in a more pluralistic and efficient manner than private vendors have done thus far.

In this chapter, the authors use the term "e-participation" initiatives to refer to government's use of ICT to engage citizens in democratic processes. The term "e-participation" is chosen because it is sufficiently general to encompass all such efforts by governments. Instances of e-participation initiatives can be found globally, such as Denmark's Nordpol.dk, the United States's Regulations.gov, and Singapore's Government Consultation Portal. The past decade has witnessed an increasing trend of information and communication technologies (ICT) exploitation by governments around the world to enhance citizen participation. This is reflected in the emergence of a plethora of terms associated with the phenomenon, such as e-consultation or online consultation, online rule-making, online deliberation online public engagement, and e-participation.

This chapter focuses on applications in blogging. A blog can be simply defined in the following manner: "A blog is an easy-to-use content management tool. When you 'blog,' you are instantly adding new content to your site via a Web interface. No technical or programming skills are necessary" (Weil, 2004, n.p.). In a nutshell, a blog is a "do-it-yourself" Web site. Gone are the days (of say 2003) when one would have to be knowledgeable in html or xml programming or make use of complex, and often expensive, Web creation software to create or update a Web site. With a blog, your Web site can be constantly added to and updated, without having to do anything more than typing (or cutting and pasting) into a text box. Through posting links, you can link your blog to any other site on the Web. You can even add audio and visual material to your blog site by uploading them, much as you would add an attachment to an e-mail. Others who find your site of interest can use RSS (really simple syndication) or sign-up for e-mail alerts to be notified when you post or add material to your blog.

This chapter looks at a particular focus of e-government, that of support for business in general and SMEs (small and medium-sized enterprises) in particular. While this is only one segment of PIT (public

information technology), it is an important one. The chapter starts with an overview of the importance of SMEs to regional and national economies, showing why governments encourage their start-up, survival and growth. Following this, an overview of e-G2B (e-government to business) initiatives around the world is provided, with particular attention directed to the SME perspective.

Chapter XI

This chapter explores the academic and government bodies of literature related to EU SMEs (small and medium-sized enterprises) e-business and policy initiatives. Definitions of SMEs are explained, the unique characteristics of SMEs and entrepreneurial characteristics are outlined, and the case made that there is a clear need for more comprehensive research on SMEs in the EU.

Chapter XII

This chapter focuses on the challenges affecting public sector information (PSI) in the European markets. The gradual "penetration" of an innovative, digitally-oriented information society in the scope of the actual convergence among telecommunications, broadcasting, and information technology, create primary opportunities for access and exploitation of PSI, in the context of a fully competitive and liberalized European electronic communications market. There are now significant challenges on the scene, for improving mutual communication between public sector and private companies, thus creating chances for exploiting new opportunities, to the benefit of the broader European market(s). However, the non-existence of an appropriate legal framework governing the conditions and/or terms for the commercial use of PSI constitutes a serious drawback for any serious attempt towards evolution, and for an effective development of a European e-communications market.

Chapter XIII

The purpose of this chapter is to provide an overview of the adoption, uses and impacts of information technology (IT), including electronic government, among local governments in the United States in the 1950s, these governments began to adopt IT for a variety of purposes and functions, and they continue to do so today. Since the mid 1970s, a small but prolific group of scholars has conducted a large body of research on various aspects of IT and local government. It is from that research and the author's own studies into this subject that the chapter is based (regarding e-government; see also, Norris, 2006). Given the constraint of space, this chapter can only highlight aspects of this important topic. Readers who wish to delve more deeply into the subject of information technology and local government may wish to avail themselves of the works found in the bibliography as well as references from other, related works which can be found through those works.

Chapter XIV

This chapter examines HRIS' impacts on operations, relationships, and transformations of local government organizations. Human resources information systems is any technology that is used to attract, hire, retain, and maintain talent, support workforce administration, and optimize workforce management. Examples include computers, Internet (Web and e-mail) or other technological means of acquiring, storing, manipulating, analyzing, retrieving, and distributing pertinent information regarding human resources (HR).

Chapter XV

This chapter presents an overview of the history, advantages, disadvantages, and design principles relating to digital libraries, and highlights important controversies and trends. Digital libraries are collections of digital content and services selected by a curator for use by a particular user community. In the last decade digital libraries have rapidly become ubiquitous because they offer convenience, expanded access, and search capabilities not present in traditional libraries. This has greatly altered how library users find and access information, and has put pressure on traditional libraries to take on new roles. However, information professionals have raised compelling concerns regarding the sizeable gaps in the holdings of digital libraries, about the preservation of existing holdings, and about sustainable economic models.

Chapter XVI

The goal of this chapter is to evaluate e-government services in Greece with a set of carefully chosen criteria, in a manner that can be used for evaluating e-government services worldwide. The impact of "e-business" on the public sector is the main source of the government's transformation towards "e-government," which refers to the public sector's efforts to use information and communication technologies to deliver government services and information to the public. E-government allows citizens to interact more directly with the government, transforming multiple operational and bureaucratic procedures and employing a customer-centric approach to service delivery; it allows intra-governmental communication; it also offers numerous possibilities for using the Internet and other Web-based technologies to extend online government services (Gant, 2002).

Chapter XVII

This chapter presents the e-government efforts in Greece. Its aim is to point out the necessity of designing and implementing efficient e-government applications. The vision of an electronically modernized Greek public administration will be realized if a series of key strategic aspects will be considered as well

as international best practices and experiences. Moreover, it will demonstrate the arising opportunities and the key challenges.

Chapter XVIII

World-wide governments are investing in initiatives to open access to information, resources, communication and services via channels typically used for electronic commerce. Government agencies are usually the leaders in communication technology commonly developed primarily for military use and later adopted by the general public. Since its inception, the Internet has gained widespread usage, prompting governments to provide online services to the public. The broad category for this type of information and services provision is called "e-government;" it is the general description of a way to provide better access to government information and services. This chapter presents New Zealand's e-government strategy in which the Internet will be used to improve the quality of the services and provide greater opportunities to participate in the democratic process for the citizens.

Chapter XIX

This chapter explores the use of e-census technologies in New Zealand. In New Zealand, the census is held every five years. A snapshot is taken on the chosen day and from that the number of people and housing units (houses, flats, apartments) are counted. Everyone in the country on that day is asked to fill in census forms. For the 2006 census an option was introduced to complete the forms on the Internet. Other initiatives included sending text messages about this process, amongst other things to the enumerators (collectors) whose job it is to collate the information in the field. The use of information technology, primarily with the Internet, offers the opportunity to distribute the information and deliver services on a very large scale.

Chapter XX

This chapter examines the objectives and challenges of the Italian plan of e-government, within which the Italian job workfair is conceived. Public administrations, during the last few years, activated modernizations in public service delivery. In particular, this arrangement relates to the service digitalization and automation, thanks to the massive inclusion of information and communication technologies in public offices. This paved the way for internal and external organizational and technological changes, in that a new approach is required to leverage the new technologies. Moreover, the Internet technologies began to play an important role in public services delivery, and many transactions are Web-based nowadays. Eventually, several governments in Europe, and others all over the world, started their own plans of e-government with the goal of increasing the amount and the quality of the service offered via the Internet to their customers (citizens, enterprises, profit and no-profit organizations).

M-commerce possesses two distinctive characteristics that distinguish it from traditional e-commerce: the mobile setting and the small form factor of mobile devices. Of these, the size of a mobile device will remain largely unchanged due to the tradeoff between size and portability. Small screen size and limited input capabilities pose a great challenge for developers to conceptualize user interfaces that have good usability while working within the size constraints of the device. In response to the limited screen size of mobile devices, there has been unspoken consensus that certain tools must be made available to aid users in coping with the relatively large volume of information. Recommender systems have been proposed to narrow down choices before presenting them to the user (Feldman, 2000). The authors propose a product catalogue where browsing is directed by an integrated recommender system.

In time, due to the increase of human-computer interaction, trust has become one of the most challenging topics in computer science. Today, trust based e-commerce decisions are becoming more valuable as Internet services are increasingly being used in business to consumer e-commerce applications. E-commerce provides a new way of shopping for the customers by offering more choices and transforming economic activity into a digital media. It also provides an opportunity for the businesses to extend their sales to a larger community. However, the success of getting higher profits and improved services are based on better communication. As in the real world, critical understanding of users' behavior in cyberspace cannot be achieved without the analysis of the factors affecting the purchase decisions (Limayem, Khalifa, & Frini, 2000). Having lots of options in an environment that is missing face-to-face interaction enforce users to make trust-aware decisions to better protect their privacy and satisfy their expectations such as quality of services.

This chapter examines how to use partial least squares (PLS) and argues that this could help to incorporate more realistic assumptions and better measurements into digital government research. It does it through a commented example of a digital government research study (Gil-García, 2005b). It is important to clarify that the intention is not to suggest that every research project should use PLS, but to encourage scholars and practitioners to seriously consider this technique as an alternative when designing and carrying out their research. PLS is a structural equation modeling (SEM) technique similar to covariance-based SEM as implemented in LISREL, EQS, or AMOS. Therefore, PLS can simultaneously test the measurement model (relationships between indicators and their corresponding constructs) and the structural model (relationships between constructs).

The advent of the Internet has altered the way that individuals find information and has changed how they engage with many organizations, like government, health care, and commercial enterprises. The emergence of the World Wide Web has also resulted in a significant increase in the collection and process of individuals' information electronically, which has lead to consumers concerns about privacy issues. Many researches have reported the customers' worries for the possible misuse of their personal data during their transactions on the Internet (Earp & Baumer, 2003; Furnell & Karweni, 1999), while investigation has been made in measuring individuals' concerns about organizational information privacy practices (Smith, Milberg & Burke, 1996). Information privacy, which "concerns an individual's control over the processing— i.e., the acquisition, disclosure, and use— of personal information" (Kang, 1998) has been reported as one of the most important "ethical issues of the information age" (Mason, 1986).

Internet growth makes feasible their use by an increased number of people around the world. This chapter examines several approaches introduced in order to create a universal access for all types of users independent of their capabilities. Nowadays, disabled people have several problems using the Web in the same way as non-disabled people, but the use of this technology is a right for everybody and more in the public administration scope in which, a lot of services must be available for users and on a correct way. Universal access may be obtained through the integration of usability and accessibility concepts in the software engineering discipline. These design methodologies consist of the possibility that every user, with independence of if they have disabilities or not, participate in all phases of the Web application development.

The quantity and diversity of information available from public government sources is now quite large. Governments, especially local ones, are using the Web to provide a number of services that are mainly informative and aim at improving the quality of life of citizens and at promoting the local community, for example job placement services, tourist information, and so on. Finally, government e-services available to citizens represent one of the most frequent and critical points of contact between public administrations and citizens. In addition to common services such as ID cards, permits, e-services represent the only practical way of providing incentives and support to specific classes of citizens. The key problem is that information must be findable (Morville, 2002). Easy and effective user-centric access to complex information is therefore one of the most critical functionalities of e-government. Since the goal is

end-user interactive access, a holistic approach, in which modeling, interface and interaction issues are considered together, must be used and will be discussed in this chapter.

Chapter XXVII

"If I have seen further it is by standing upon the shoulders of giants." The famous statement of Sir Isaac Newton demonstrates that the progress of science relies on the dissemination of discoveries and scientific knowledge. Even though scientific progress is not strictly cumulative (Kuhn, 1970) information sharing is the heart of this progress. Nowadays, scientific knowledge is mainly spread through scholarly journals, that is, highly specialized journals where quality controls and certifications are achieved through peer-review. The first section of this chapter will present the specificity of the current economic model of scientific publications. The second section will introduce to the open access movement and to its emerging economic model. The third section will show the growing implication of governments in that movement.

Chapter XXVIII

As the Internet becomes increasingly central to living in today's society, it becomes important that certain groups are not systematically excluded. This chapter examines the digital divide with an emphasis on critical perspectives that recognize power, racism, and social stratification and the challenges faced by public officials to promote information technology policies and programs that support social equality.

Chapter XXIX

In this chapter, efforts are made to define digital divide, unravel the status of Africa in the global digital map, enumerate the causes of low level of ICT The provision of communication services in developing regions (like Africa) is an essential aspect of enhancing and facilitating the rate of economic and social development (Yavwa & Kritzinger, 2001). There is thus the need for African countries to make frantic efforts to ensure that ICTs are provided adequately and consistently to close the divide and reap the benefits of economic and social development.

Chapter XXX

The purpose of this chapter is to discuss professional ethical issues in research activities conducted in e-public administration, most of which are common to the private and non-profit sectors. It offers an overview of key ethical issues in this field and identifies ethical challenges raised by the application of information and communications technologies (ICT) in public administration research activities. The evidence available shows that ICT places new ethical challenges but does not change radically the nature of ethical problems characteristic of paper-based and face-to-face public administration.

New technologies can lead to social upheaval and ethical dilemmas which are unrecognized at the time of their introduction. Medical care technology has advanced rapidly over the course of the past two decades and has frequently been accompanied by unforeseen consequences for individuals, the medical profession and government budgets, with concomitant implications for society and public policy (Magner 1992; Marti-Ibanez 1962). Advances in information technology (IT) during the last decade and a half are now impacting the medical profession, and the delivery of medical advances, in ways that will impact public policy debates for the foreseeable future. The World Wide Web makes information that was once the eminent domain of medical professionals available to average citizens who are increasingly demanding medical treatments from the leading edge of medical technology.

Public information technology, as a term, implicitly suggests universal access by citizens to information through the use of technology. The concepts of social capital and the digital divide intersect in access to public information technology. Social inclusion or exclusion occurs as a consequence of the ways in which societies are stratified according to race, gender, (dis)ability, ethnicity and class. This chapter focuses especially on one aspect of stratification, gender and theorizes the gendering of differential access and use of information technologies. An understanding of gendered participation relevant to access to public information technology within the policy contexts for electronic government and social inclusion is important to inform public information technology policy, and service planning and delivery that are premised on the notion of universal access.

This chapter examines the diffusion of information technology in the public sector and how it provides the opportunity to apply the appropriateness of diffusion theory in a combined context of information technology and public policy innovation. The ability to understand the salient aspects of innovations as perceived by the members of a social system is essential to the success of planned change.

This chapter provides a brief overview of institutional theory in various disciplinary traditions, with an emphasis on institutional theory in sociology. The authors identify various patterns of the use of institutional theory in information systems and e-government research. They also discuss future trends in e-government based on institutional theory. Additionally, based on their analysis of the current state of the art, the authors suggest some research directions for using institutional theory in future e-government research.

This chapter presents several examples of how the structuration theory has been applied to study IT in both public and private sector organizations. The authors highlight the usefulness of this perspective to understand incremental and radical change in organizational and inter-organizational settings. The chapter highlights the characteristics of the ensemble view of IT in organizations and provides a brief overview of the structuration theory. Also presented are four influential models that apply the structuration theory to information systems research. Additionally, the chapter argues that previous models have mainly explained incremental change within organizational settings and an important future trend for public information technology research should be to understand radical change and inter-organizational relationships.

Section III
Security and Protection

Intelligence and security informatics (ISI) is the application of information systems (IS), databases and data coding schemes to issues of intelligence gathering, security and law enforcement. This chapter examines the differences between ISI and other disciplines of informatics. ISI differs from other disciplines because of the critical role played by the general public in data gathering and information dissemination. Three major differences exist between ISI and other forms of informatics, and these differences make ISI unique in terms of data collection and dissemination. The differences are: (1) data source reliability, (2) the need to determine which datum is relevant, and (3) the need to disseminate the finding to the general public without knowing in advance the appropriate individuals or institutions needing to be informed.

Governments have the obligation to manage their information security risks by securing mission critical internal resources such as financial records and taxpayer sensitive information on their networks. Consequently, public sector information security officers are faced with the challenge to contain damage from compromised systems, prevent internally and Internet launched attacks, provide systems for logging and intrusion detection, and build frameworks for administrators to securely manage government networks (Oxenhandler, 2003). This chapter discusses some of the cost-effective measures needed to address information security vulnerabilities and related threats.

The purpose of this chapter is to explain how digital convergence is affecting the public sector and the need for a cyber security policy that includes the active involvement of both the public and private sectors. Digital convergence constitutes the full realization of the information age and provides the foundation to link cultural, personal, business, governmental, and economic affairs into a rapidly expanding global digital world called cyberspace. However, this linking of people around the globe is challenging the government to actively work with private industry to ensure its critical infrastructures and associated information is adequately protected.

This chapter examines how public health information technology (IT) can aid public health preparedness in terms of bioterrorism preparedness and associated emergency response. Most analyses of possible future bioterrorism events predict they may be similar to the anthrax events of 2001, specifically a limited population of individuals may experience morbidity or mortality, but the concern, panic, and worry stirred up by the threat will catch the attention of the entire nation. If public health IT is to help with bioterrorism preparedness, it needs to not only address mitigation of civilian illnesses and deaths, but also help to manage individual and societal fears springing from the real or threatened occurrence of such an event.

All branches of federal government are required to migrate their business practices to a paperless operation. Privacy and information security (InfoSec) are critical for protection of information shared over networks internally between the US Government agencies and externally with non-federal organizations (businesses; state, local, and foreign governments; academia; etc.) or individuals. This chapter will examine public key infrastructure (PKI), which is the simplest, most widely used architecture for secure data exchange over not-secure networks. It integrates computer hardware and software, cryptography, information and network security, policies and procedures to facilitate trust in distributed electronic transactions and mitigate the associated risks.

We are in the midst of what may become one of the true technological transformations of our time. RFID (radio frequency identification) is by no means new a "new" technology. This chapter examines several dimensions of RFID, which is fundamentally based on the study of electromagnetic waves and radio, pioneered in the nineteenth century work of Faraday, Maxwell, and Marconi. The idea of using radio frequencies to reflect waves from objects dates back as far as 1886 to experiments conducted by Hertz. Radar was invented in 1922, and its practical applications date back to World War II, when the British

used the IFF (identify friend or foe) system to identify enemy aircraft (Landt, 2001). Stockman (1948) laid-out the basic concepts for RFID. However, it would take decades of development before RFID technology would become a reality. Since 2000, significant improvements in functionality, decreases in both size and costs, and agreements on communication standards have combined to make RFID technology viable for commercial and governmental purposes. Today, RFID is positioned as an alternative way to identify objects to the ubiquitous bar code.

Chapter XLII

There has been a lot of research done on the area of intelligent agents. Unfortunately, there is no standardization in the various proposals, resulting in vastly different agent systems. Efforts are made to standardize some aspects of agent systems so that different systems can interoperate with each other. This chapter will examine some of the leading standards in agent representation including KQML and agent TCL, their security vulnerabilities and the application of safety protocols. This chapter will examine these standards in the context of e-commerce and m-commerce and efforts to protect transactions through SAFE (secure roaming agent for e-commerce) and offer a look at interoperability in roaming systems.

Chapter XLIII

This chapter discusses security and integrity issues facing agent technology. Various frameworks are discussed including SAFER, or secure agent fabrication, evolution and roaming, which is a mobile agent framework that is specially designed for the purpose of electronic commerce (Guan & Hua, 2003, Guan et al., 2004; Zhu et al., 2000). By building strong and efficient security mechanisms, SAFER aims to provide a trustworthy framework for mobile agents to assist users in conducting mobile or electronic commerce transactions. Agent integrity is another area crucial to the success of agent technology (Wang et al., 2002). Despite the various attempts in the literature, there is no satisfactory solution to the problem of data integrity so far. Some of the common weaknesses of the current schemes are vulnerabilities to revisit attack when an agent visits two or more collaborating malicious hosts during one roaming session and illegal modification (deletion/insertion) of agent data. Agent monitoring protocol (AMP) (Chionh et al., 2001) is examined, which is an earlier proposal under SAFER to address agent data integrity, does address some of the weaknesses in the current literature.

Volume II

Chapter XLIV

This chapter examines the several important contributions and improvements data mining has introduced to the field of IDS (intrusion detection system) technology. Over the past few years, the Internet has

changed computing as we know it. The more possibilities and opportunities develop, the more systems are subject to attack by intruders. Thus, the big question is about how to recognize and handle subversion attempts. One answer is to undertake the prevention of subversion itself by building a completely secure system. However, the complete prevention of breaches of security does not yet appear to be possible to achieve. Therefore these intrusion attempts need to be detected as soon as possible (preferably in real-time) so that appropriate action might be taken to repair the damage. This is what an IDS does. IDSs monitor and analyze the events occurring in a computer system in order to detect signs of security problems. However, intrusion detection technology has not yet reached perfection.

Section IV
System Design and Data Processing

This chapter presents system dynamics as a method to get a better understanding of such mismatches in public information technologies. The method has already been used successfully in planning and evaluation of both public and private IT applications (Madachy & Tarbet, 2000; Tarek K. Abdel-Hamid & Madnick, 1991; Wolstenholme, 2003; Wolstenholme, Henderson, & Gavine, 1993). The method allows to understand the interactions among technologies and organizations as a continuous process of organizational change (March, 1981), in which is possible to find brief periods of rapid change. However, even those periods of rapid change are conceptualized as the result of endogenous and continuous local adaptations (Hutchins, 1991), where technology enables, not causes change (Orlikowski, 2000). Also presented are the basic principles and tools of system dynamics, and continues with an example of its application in the analysis of an IT project in the Public Sector. The chapter ends with a brief description of future trends in modeling and simulation as well as a brief conclusion.

The purpose of this chapter is to discuss the process involved in managing knowledge, considering critical factors in the process. In this way, the chapter is organized in four different but conceptually interrelated sections. In the first of them, the author describes some of the main concepts of knowledge and knowledge management. The second section is a description of the process as stated in the original question, and the next one is a brief discussion on the impact of the four critical factors identified by Arthur Andersen and Company on the main stages in the process in the way that is proposed in the initial question. The last sections of the chapter constitute a description of future trends and conclusions to the essay.

While most of the prior research studies have investigated the possible application of KM in the public sector, none have focused on the application of KM in e-government; this is done through this chapter. In

this chapter, the author, recognizing the importance of e-government and KM to devolve into the public administration sector, continues his previous research related to the application of KM in e-government (Metaxiotis & Psarras, 2005), discusses key issues and presents a framework for the application of KM in e-government as a basis for future research.

This chapter examines the three layers of Web applications: conceptual, presentation, and navigation; and its two perspectives: designer and viewer. Software evolution is "the dynamic behavior of programming systems as they are maintained and enhanced over their life times" (Belady & Lehman, 1976). Web application evolution is of increasing importance as more Web systems are in production. Many companies use the Web to communicate with the external world as well as within their organizations and to carry out their business processes more effectively. Web technologies have been adopted by organizations in the public sector. Many state agencies provide their services via the Web. This study investigates the management of e-government applications at a U.S. state technology agency (STA).

A review of the development of information systems can help in understanding the potential significance of Web services and service oriented architecture (SOA) in the public sector. SOA involves the convergent design of information systems and organizational workflows at the level of services. The purpose of this chapter is to suggest a strategy for mapping the design of service oriented architectures on to the complex patterns of governance including combinations of federalism, regionalism and outsourcing of functions from government agencies to nonprofit organizations. This involves the modeling of workflows and the identification of opportunities for the sharing of services among agencies and nonprofits.

The goal of the research presented in this chapter is to analyze the strategic determinants influencing the decision-making for using and implementing shared services. The structure of this chapter is as follows. In the following section we discuss the historical and theoretical background of shared services. In the section thereafter we provide an overview of the strategic determinants influencing the shared services decision. Next, both future trends and future research directions are presented and finally, in section six, conclusions are drawn.

This chapter examines the application of data mining within public organizations. In general, data mining is a data analytical technique that assists businesses in learning and understanding their customers so that

decisions and strategies can be implemented most accurately and effectively to maximize profitability. Data mining is not general data analysis, but a comprehensive technique that requires analytical skills, information construction, and professional knowledge. Businesses are now facing global competition, and are being forced to deal with an enormous amount of data. The vast amounts of data and the increasing technological ability to store it also facilitated data mining. In order to gain a certain level of competitive advantage, a data analytical technology called data mining is now commonly adopted among businesses. Organizations use data mining as a tool to forecast customer behavior, reduce fraud and waste, and assist in medical research.

Chapter LII

This chapter examines data clustering, a discovery process that partitions a data set into groups (clusters) such that data points within the same group have high similarity while being very dissimilar to points in other groups (Han, 2001). The ultimate goal of data clustering is to discover "natural" groupings in a set of patterns, points, or objects, without prior knowledge of any class labels. In fact, in the machine learning literature, data clustering is typically regarded as a form of unsupervised learning as opposed to supervised learning. In unsupervised learning or clustering, there is no training function as in the supervised learning. There are many applications for data clustering including, but not limited to, pattern recognition, data analysis, data compression, image processing, understanding genomic data, and market-basket research.

Chapter LIII

This chapter reviews the main concepts at the basis of multidimensional (data warehouse) modeling and navigation. We also illustrate some peculiarities of statistical data that make the implementation of a statistical data warehouse that is a statistical dissemination system enabling the user to perform a multidimensional navigation, a challenging issue in many aspects. Finally, we analyze the main characteristics of some of the most important systems for the dissemination of statistical data on the Web, distinguishing two main approaches, the former based on a free navigation on specific subcubes, the latter on a constrained navigation on a single data cube.

Chapter LIV

Massive quantities of information continue accumulating at about 1.5 billion gigabytes per year in numerous repositories held at news agencies, libraries, corporate intranets, PCs, and the Web. A large portion of all available information exists in the form of texts. Researchers, analysts, editors, venture capitalists, lawyers, help desk specialists, and even students are faced by text analysis challenges. This chapter explores text mining tools which aim at discovering knowledge from textual databases by isolating key bits of information from large amounts of text, identifying relationships among documents. Text mining technology is used for plagiarism and authorship attribution, text summarization and retrieval,

and deception detection.

This chapter aims in summarizing some of the latest efforts in assessing quality of statistical results in national public administrations and international organizations in order to meet demands for comparable, high quality and reliable statistics used for economy and policy-monitoring purposes. Topics that are covered include quality criteria proposed by national and international organizations, metadata requirements for quality reporting and transformations that should be integrated in the workflow process of public administrations' information systems for automatic manipulation of both data and metadata, thus minimizing errors and assuring quality of results.

Automatic image annotation is derived from the manual annotation for CBIR. Since the semantic gap degrades the results of image search, the text descriptions are considered. It is desired that the text and the visual features can cooperate to drive more effective search. The text labels, as the high-level features, and the visual features, as the low-level features, are complementary for image content description. Therefore, automatic image annotation becomes an important research issue in image retrieval. In this chapter, some approaches for automatic image annotation will be reviewed and one of the typical approaches is described in detail. Then the keyword-based image retrieval is introduced. The general applications of automatic image annotation are summarized and explained by figure examples.

This chapter examines the applications of online analytical processing and data cube technologies in the public sector. Since the late 80's and early 90's, database technologies have evolved to a new level of applications—online analytical processing (OLAP)—where the executive management can make quick and effective strategic decisions based on the knowledge in terms of queries against large amount of data stored. Some OLAP systems are also regarded as decision support systems or executive information systems. The traditional, well-established online transactional processing systems such as relational database management systems mainly deal with mission critical daily transactions. Two cases are examined within this chapter. One case is related to data analysis for student retention. Another case is related to NSF grant awards analysis. One may want to know the number of awards grouped by schools, by disciplines, by regions, by amounts, by dates, and so on, and grouped by any arbitrary combination of these dimensions.

Information technology affects organization and society itself, as it redefines work content, reorganizes leadership styles and cultures, reshuffles power hierarchies and spawns a series of both man-designed and spontaneous adaptations. Information technology oftentimes necessitates a new division of labor that creates policy problems and loss of accountability. Organizational leadership, especially in the public sector, urgently requires a theoretical as well as a practical revaluation to cope with the structural and functional changes within work and administrative organizations. This chapter seeks to elucidate three leadership models in the context of IT-induced changes in organizational forms and processes, networked leadership, organic leadership, and gatekeeper leadership models.

This chapter examines the realm of human factors design for public information technology in the rapidly evolving post-modern "knowledge age" of the 21st century, with special focus on how new research and development into human cognition, perception and performance capabilities is changing the design function for IT systems and products. Many "one size fits all" IT designs are neither adaptive nor adaptable—promulgating a top-down technological imperialism penetrating every aspect of their use. The communication, collaboration, and interaction infrastructure of IT organizations thus remains acutely challenged with enduring problems of usability, learnability, accessibility, and adaptability. As the function and form of products undergoes increasingly rigorous scrutiny, one important design goal is emerging as a paramount priority: improving the usability of products, tools and systems for all stakeholders across the enterprise. It is therefore important to briefly describe emerging human factor design knowledge and practices applicable to organizations that invent, incubate, innovate, prototype, and drive the creation and application of public IT. The findings here suggest the most effective strategies to manage and augment user-centered design endeavors across a wide array of public IT products and organizations.

This chapter examines the outsourcing of services by governments as the result of public sector reforms. Outsourcing has been argued to lead to cost savings; "improved discipline"; better services; access to scarce skills; and the capacity for managers to focus more time on the "core business" of their organizations (Domberger, 1998). Government outsourcing initiatives have encompassed a range of services, but given the large sums of money invested in IT assets, outsourcing of IT services (IT outsourcing, or ITO) has been a major initiative for many agencies. Case studies have reported ITO successes and failures (e.g., Currie & Willcocks, 1998; Rouse & Corbitt, 2003a; Willcocks & Kern, 1998; Willcocks & Lacity,

2001; Willcocks & Currie, 1997), but much of the evidence presented to public sector decision makers to justify this reform is anecdotal and unsystematic, and when investigated in depth does not necessarily support widespread conclusions.

The purpose of this chapter is to undertake a critical examination of the emergence of e-health in the Canadian province of Ontario. More than solely a technological challenge, the emergence and pursuit of e-health denote a complex governance transformation both within the province's public sector and in terms of public-private partnering. The Ontario challenge here is complicated by the absence of formal regional mechanisms devoted to health care, a deficiency that has precipitated the creation of local health integration networks to foster e-health strategies on a sub-provincial basis, as well as ongoing difficulties in managing public information technologies. With respect to public-private partnering, a greater regionalization of decision-making and spending authorities, within transparent and locally accountable governance forums, could provide incentives for the private sector to work more directly sub-provincially, enjoying greater degrees of freedom for collaboration via more manageable contracting arrangements.

This chapter sheds light on the needed policy guidelines and standards for safeguarding an agency's information resources. The evolving nature of information security threats such as cyber crime, as well as the need to ensure confidentiality and privacy of citizen information and to protect critical infrastructure call for effective information security management in the public sector. E-government applications have made it easier for citizens to conduct business online with government agencies, although their trust in the ability of governments to keep that information private is low. Considering the amount of citizen information held by governments at all levels, and the steps needed to address potential homeland security and information technology (IT)-related threats to critical infrastructure, the need for effective means of safeguarding public agency data has become an issue of paramount importance. In addition, the need to ensure integrity and availability of public information resource is crucial to many government operations.

The intent of this chapter is to provide an overview of different approaches to Web site evaluation in order to suggest further application and development of evaluation instruments. In recent times, the popularity of the Internet has led to e-government practices being widely recognized as an important option for service to the general public. In response, various tiers of government from national to local level have sought opportunities to engage the public through Web sites. Many governments now provide some level of access to government through Web interfaces, for example through access to resources such as publications and government data. In some cases there are services provided that may be executed online. For example users may provide personal information for licensing or to undertake payments. There continues to be a diversity of implementation quality and levels for such services.

The main objective of this chapter is to identify evaluation issues that are critical in implementation of IT projects by public sector organizations. A key contribution of the chapter is to identify and examine evaluation issues and other key factors faced by public sector organizations undertaking IT projects. The key issues presented in this chapter are of interest to senior public sector executives concerned with making decisions about IT investments and realizing IT benefits.

Based on the analysis of three federal initiatives, this chapter argues that due to how much ICT is embedded in government institutional and organizational environments, the tensions between performance and accountability become also reflected in the goals, features, and functionality of e-budgeting projects (See terms and definitions). Further, the prevalence of accountability for finance and fairness (accountability bias) already identified in the literature (Behn, 2001) is also reflected in the formal goals, general characteristics, and technical capabilities of the e-budgeting systems. The cases thus support the general hypothesis that information technologies do not necessarily have the power to transform government radically, at least not in the case of e-budgeting initiatives.

The ubiquitous nature of information technology at all levels of government and the core requirement to recruit and retain qualified technology professionals calls for an expansion in the body of research; this research can provide invaluable insight into the success and failure in public sector information technology human resource practices. The intent of the research within this chapter is the utilization of the DeMers' (2002) seven-pronged approach to critically examine Mississippi state government agencies with the expected result of assessing the effectiveness and efficiency of the IT personnel classification system. This leading-edge and highly effective IT personnel classification system, designed specifically to improve IT recruitment and retention, was implemented by the state of Mississippi in partnership with the Hay Group, an internationally-known human resource consultancy.

Section VI
Selected Readings

Originally published in the Journal of Global Information Management, Vol. 13, No. 1, this article addresses the following key question: given the wide variety of visions, strategic agendas, and contexts

of applications, how may we assess, categorize, classify, compare, and discuss the e-government efforts of various government administrations? In answering this question the authors propose a generic e-government framework that will allow for the identification of e-government strategic agendas and key application initiatives that transcend country specific requirements. In developing the framework a number of requirements are first outlined. The framework is proposed and described. It is then illustrated using brief case studies from three countries. Findings and limitations are discussed.

Chapter LXVIII

Originally published in the International Journal of Electronic Government Research, Vol. 1, No. 2, this article describes a Web-based query system for semantically heterogeneous government-produced data. Geospatial Web-based information systems and portals are currently being developed by various levels of government along with the GIS community. Typically, these sites provide data discovery and download capabilities but do not include the ability to pose DBMS type queries. The authors extend work in schema integration by focusing on resolving semantics at the value level in addition to the schema or attribute level. They illustrate their method using land use data, but the method can be used to query across other heterogeneous sets of values. Their work starts from an XML Web-based DBMS and adds functionality to accommodate heterogeneous data between jurisdictions. Their ontology and query rewrite systems use mappings to enable querying across distributed heterogeneous data.

Chapter LXIX

Originally published in the *International Journal of Electronic Government Research, Vol. 1, No. 1,* this article evaluates the current practice of digital government in large municipalities worldwide. The study assesses 84 cities from around the world using a five-stage e-government framework. The authors' research and methodology goes beyond previous research by utilizing 92 measures that were translated into the native language of each city, and the assessment of each municipal Web site was conducted by a native speaker of the municipality's language between June and October of 2003. They review relevant e-government literature for evaluating Web sites in the United States and internationally, discuss our sample selection, methodology, theoretical framework, findings, and recommendations. Their results indicate that Seoul, Hong Kong, Singapore, New York, and Shanghai are the top five large cities in the providing digital government opportunities to citizens online. In addition, the authors' research suggests a difference in the digital government capabilities between the 30 developed nations belonging to the Organization for Economic Co-operation and Development (OECD) and lesser-developed (non-OECD) nations.

Originally published in the International Journal of Electronic Government Research, Vol. 2, Issue 4, this article examines the user help and service navigation features in government Web sites and compares them across levels of government. These features are critical to ensuring that users unfamiliar with government are able to successfully and easily access e-government services and information. The research finds clear patterns in the use of similar help and navigation features across governments, leading to a conclusion that these features are diffusing in the public sector Web development field. The chapter concludes by stating that Web developers should work to overcome a second digital divide—one of a lack of knowledge of Web site organization and government structure. Users need to be actively assisted to find information by Web developers.

Originally published in the International Journal of Information Technology and Web Engineering, Vol. 1, Issue 3, this article reports the results of a migration to open source software (OSS) in public administration. The migration focuses on the office automation field and, in particular, on the OpenOffice. org suite. The authors have analyzed the transition to OSS considering qualitative and quantitative data collected with the aid of different tools. All the data have been always considered from the point of view of the different stakeholders involved, IT managers, IT technicians, and users. The results of the project have been largely satisfactory. However the results cannot be generalized due to some constraints, like the environment considered and the parallel use of the old solution. Nevertheless, the authors think that the data collected can be of valuable aid to managers wishing to evaluate a possible transition to OSS.

Originally published in the International Journal of E-Business Research, Vol. 2, Issue 4, this article explores the processes of strategic and organizational transformation engendered by e-business implementation in a commercialized British public sector organization within the geographic information industry. Recognized as a leading participant in the geographic information industry, within which it is forging partnerships with key private sector companies, the organization has enthusiastically grasped e-business as an all-embracing phenomenon and implemented a new strategy that transformed the way it did business. The case analysis illustrates the challenges and constraints that this organization is facing in implementing e-business strategies in practice.

The Internet provides a new digital opportunity for realizing democracy in public administration, and this study raises a central question: What factors determine public officials' acceptance of the practice of digital democracy on government Web sites? The authors focus on online policy forums among many practices of digital democracy. To gauge public officials' behavioral intentions to use online policy forums on government Web sites, they examined individual and organizational factors, as well as system characteristics. They also administered a survey questionnaire to Korean public officials and analyzed a total of 895 responses. Path analysis indicates that three causal variables are important in predicting public officials' intentions to use online policy forums: perceived usefulness, attitudes toward citizen participation, and information quality. In this article, originally published in the International Journal of Electronic Government Research, Vol. 2, Issue 2, the authors discuss implications of this study for practices and theories of digital democracy.

After six years of challenges and learning pushing forward the e-government agenda in Mexico, the Presidential succession brought an opportunity for assessing the current progress, recognizing the main unsolved problems, and planning the vision for the future of e-government in Mexico. This case, originally published in the International Journal of Cases on Electronic Commerce, Vol. 3, Issue 2, provides a rich description of the e-Mexico system, including its main objectives and goals, governance structures, IT infrastructure, collaboration processes, main results, and current challenges. Some background information about Mexico is also provided at the beginning of the case. Playing the role of a consultant working for the new Mexican CIO, the reader is asked to evaluate the current situation and help in the design of a work plan, including a proposal for organizing the ICT function, the main strategic objectives, and some specific lines of action for the next six years.

The core issue for this study concerns less the social than the political consequences of the rise of knowledge societies, in particular the capacity of the Internet for strengthening democratic participation and civic engagement linking citizens and government. To consider these issues, this article, originally published in the International Journal of Electronic Government Research, Vol. 1, No. 1, is separated into four parts. Part I summarizes debates about the impact of the Internet on the public sphere. Part II summarizes the sources of survey data and the key measures of political activism used in this study, drawing upon the 19-nation European Social Survey, 2002. Part III examines the evidence for the relationship between use of the Internet and indicators of civic engagement. The conclusion in Part IV summarizes the results and considers the broader implications for governance and democracy.

Chapter LXXVI

Adoption and Implementation of IT in Developing Nations: Experiences from Two
Public Sector Enterprises in India / *Monideepa Tarafdar and
Sanjiv D. Vaidya*

Originally published in the Journal of Cases on Information Technology, Vol. 7, No. 1, this case describes issues in IT adoption at two large public sector organizations in India. Along with illustrating the significance of top management drive and end-user buy in, it particularly highlights the role of middle management in managing the IT adoption process at different levels in these large organizations.