E-Government Series

February 2001

Commerce Comes to Government on the Desktop: E-Commerce Applications in the Public Sector

Genie N. L. Stowers
Director, Public Administration Program
and Professor of Public Administration
San Francisco State University

The PricewaterhouseCoopers Endowment for
The Business of Government

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Through grants for Research and Thought Leadership Forums, The PricewaterhouseCoopers Endowment for The Business of Government stimulates research and facilitates discussion on new approaches to improving the effectiveness of government at the federal, state, local, and international levels.

Founded in 1998 by PricewaterhouseCoopers, The Endowment is one of the ways that PricewaterhouseCoopers seeks to advance knowledge on how to improve public sector effectiveness. The PricewaterhouseCoopers Endowment focuses on the future of the operation and management of the public sector.

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Foreword

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On behalf of The PricewaterhouseCoopers Endowment for The Business of Government, we are pleased to present this report by Genie N. L. Stowers, "Commerce Comes to Government on the Desktop: E-Commerce Applications in the Public Sector." This report is one of a series on e-government topics. In an earlier Endowment report entitled "The Auction Model: How the Public Sector Can Leverage the Power of E-Commerce Through Dynamic Pricing," David C. Wyld explores specific challenges facing public sector managers and elected officials in implementing dynamic pricing concepts. In another report, entitled "Privacy Strategies for Electronic Government," Janine S. Hiller and France Bélanger provide a framework for understanding the implications of privacy and security in the public domain, the challenges of using the Internet to deliver services and information, and lessons learned from the private sector.

E-business and e-commerce are fast spreading throughout the United States and around the world, following the growth of the Internet. This increase and rapid growth in technology has led to an explosion of interactive service delivery and retailing over the World Wide Web, known as e-commerce. This report will examine how this phenomenon has spread from the private to the public sector.

This report focuses on four case studies in public sector e-commerce: innovations in San Carlos, California, despite its small jurisdiction; the strategic planning for e-commerce in the state of Washington; the leadership and local partnerships of the Commonwealth of Massachusetts; and the U.S. Department of Defense EMALL project. These studies illuminate the importance of strategic planning, marketing, customer service, and partnerships in the success of implementing government e-commerce.

It is our hope that this report will assist federal, state, and local government executives in designing and implementing e-commerce applications that provide value-added services to all citizens.

Paul Lawrence
Partner, PricewaterhouseCoopers
Co-Chair, Endowment Advisory Board
paul.lawrence@us.pwcglobal.com

Ian Littman
Partner, PricewaterhouseCoopers
Co-Chair, Endowment Advisory Board
ian.littman@us.pwcglobal.com

Executive Summary

E-business and e-commerce are fast spreading throughout the United States and around the world, following the growth of the Internet. This trend is also being seen in the public sector, where more and more e-commerce applications are being developed and Congress has promoted e-government in recent legislation. The Information Technology Management Reform Act of 1996 (also known as the Clinger-Cohen Act) set the stage by forcing the appointment of a chief information officer (CIO) for each federal agency with responsibility for coordinating technology efforts. The Government Paperwork Elimination Act of 1998 and Digital Signature legislation of 2000 promoted the use of electronic technology to streamline processes and reduce paperwork, and now allow agencies to use an electronic "signature" rather than pen-and-paper signatures.

This report discusses e-commerce applications in general, with examples from the private sector. Using the main categories of e-commerce, it provides examples of each type from the public sector. Interviews and a comprehensive review of both private and public sector websites were used to develop private sector best practices or standards, case studies, and lessons learned. Four case studies are examined in detail:

- San Carlos, California's extensive innovation despite its small jurisdiction
- The state of Washington's strategic planning for e-commerce
- The Commonwealth of Massachusetts' leadership and leverage of local partnerships for e-commerce implementation
- The U.S. Department of Defense EMALL project

Recommendations

There is enormous potential in e-commerce applications for the future — potential to bring routine transactions right to the desktop on a 24/7 basis for citizens. There are many important considerations for e-commerce development and implementation, and the lessons learned by San Carlos, the state of Washington, the Commonwealth of Massachusetts, and the Department of Defense. These jurisdictions learned many lessons that are applicable to other federal, state, and local agencies that are planning or implementing e-government services or e-commerce.

Planning and Expertise

- Agencies should develop appropriate experience with basic e-government activities before moving on to more complex e-commerce operations
- Agencies must have a strategic vision for the project and should ask appropriate strategic questions before beginning the project
- Support and strategic vision from top leadership in the agency or jurisdiction is key

Customer/Citizen Service

- Citizen service is the most important consideration; plan for user-friendly services with the user in mind or as a participant in the planning process
- Provide content and value-added services to build a community around the site
- Use familiar models of operation to help citizens use the system
- Projects must be marketed; "build it and they will come" will not work
- Reach across the digital divide and provide affirmative outreach to citizens who might not have the necessary expertise or access to equipment

Resources

- Adequate monetary and staffing resources are crucial
- If resources are constrained, consider collaborating with other agencies or umbrella groups
- Adequate flexibility and speed to hire IT staff is important
- Adequate IT/web design training for existing staff is necessary and will promote retention
- If possible, have a centralized purchasing and data architecture
- Take advantage of lessons learned elsewhere

The Future of E-Commerce

As fast as these developments are moving, there are more on the horizon that will impact e-government and e-commerce applications in the public sector. Already, states and the federal government have announced new initiatives. For example, the federal government has created the FirstGov.gov portal site, and California has announced a $10 million e-government initiative to add $2.45 million for government-to-business (G2B) systems and $1.2 million for government-to-citizen (G2C) systems, among other projects.

While the advances are exciting and interesting, many challenges and concerns remain. The digital divide between those who can afford the technology and expertise required to take advantage of e-commerce and those who cannot is declining in some ways and remaining stable in others. The disparities between men and women, urban and rural residents, and the young and older citizens has declined significantly; however, African American and Hispanic households are still less likely to use the Internet than their white counterparts. Another challenge for the public sector is the necessity to maintain the privacy, security, and confidentiality of citizens' records. Finally, public sector operations are by nature limited in size and scope when compared to their private sector counterparts. In fact, in many cases there are no private sector counterparts due to the nature of the government service. In these cases, public sector e-commerce is limited in its ability to attract a global audience in ways that the private sector is not.

Additional Resources

A website (bss.sfsu.edu/~mpa/faculty/facultyprojects/ecommerceproject.htm) is available that offers links to all of the examples in this report as well as to important resources in the area of public sector e-commerce applications.

The Development of Electronic Commerce*

E-business and e-commerce are fast spreading throughout the United States and around the world, following the growth of the Internet. From March 1999 to March 2000, worldwide Internet usage increased from 171 million to 304 million people (78 percent increase). This increase and the rapid change and growth in technology have led to a burgeoning of interactive service delivery and retailing over the World Wide Web, often known as e-commerce. In the first quarter of 2000, e-commerce sales represented 0.70% of total retail sales (up from 0.63% during fourth quarter 1999). By 1998, Dell Computer's online sales had doubled from the previous year and were 25% of their revenues (Henry et al, 1999) while online brokerages added 1.2 million accounts and $100 billion in new assets in just the first quarter of 1999.[1] The U.S. Census Bureau estimates e-commerce activity in the first quarter of 2000 at $5.26 billion, an increase of 1.2 percent from fourth quarter 1999 estimates.[2]

Public sector e-commerce activities are a subset of digital government, or e-government, activities. This report will examine how this phenomenon has spread from the private to the public sector; currently, the main focus is on procurement activities, driver's license renewals, online tax filing, and the purchase of vital records and data online. The report includes descriptions of best practice sites in the private sector, case studies of outstanding public sector examples, and lessons learned from these examples. The Appendix includes a listing of all states and their current e-commerce activities. Finally, a website of all examples discussed here is available at bss.sfsu.edu/~mpa/faculty/facultyprojects/ecommerceproject.htm.

The report has been based upon examination of key informant interviews, primary documents, and a comprehensive examination of private and public sector websites utilizing e-commerce. See "Definitions" on p. 7 for further explanations of these processes.

Early forms of e-commerce, such as credit cards, ATM machines, Electronic Data Interchange (EDI), and Electronic Funds Transfer (EFT), have existed for 20 years. The decentralization of computing onto desktop personal computers, the creation of the Internet (1969) and then the World Wide Web (1990-93), their development as business and service tools beginning in 1995, and the monumentally fast-growing use of the Internet have set the stage for the use of these technologies as tools of e-commerce. The first efforts in retail e-commerce were initiated in 1995 by Amazon.com, e-Trade, and Autobytel, and were based upon "brick and mortar" versions of the traditional retailing model.

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[1] *Economics and Statistics Administration. 2000. Digital Economy 2000 U.S. Department of Commerce: p. 7.*

[2] *U.S. Census Bureau. 2000. U.S. Department of Commerce News. Available at www.census.gov/mrts/www/current.html.*

Definitions

E-Government:
"Government's use of technology, particularly web-based Internet applications, to enhance the access to and delivery of government information and service to citizens, business partners, employees, other agencies, and government entities."

David L. McClure
"Electronic Government: Federal Initiatives are Evolving Rapidly but They Have Significant Challenges"
(GAO / T-AIMD/GGD-00-179 Testimony)

E-Commerce:
"Electronic commerce (e-commerce) is any transaction completed over a computer-mediated network that transfers ownership of, or rights to use, goods or services. Transactions occur within selected electronic business processes. Transactions are 'completed' when the agreement between buyer and seller to transfer the ownership or rights to use goods and services occurs over computer-mediated networks. Only priced transactions will be measured."

Atrostic, B.K., Gates, John; and Jarmin, Ron. 2000. Measuring the Electronic Economy: Current Status and Next Steps. U.S. Census Bureau, June 2000: www.census.gov/econ/www/ebusinessC.pdf, p. 2.

E-Commerce in Government:
For government, e-commerce could be defined as "any process or transaction conducted by a government organization over a computer-mediated network that transfers ownership of, or rights to use, goods, services, or information."

(Based on U.S. Department of Commerce definition from Economics and Statistics Administration. 2000. Digital Economy 2000. *U.S. Department of Commerce: p. 7.)*

The following components are crucial for the development of an e-commerce system:[3]

- **The ability to acquire and store information.** Companies or agencies must be able to digitize and manage information effectively and efficiently. At most e-commerce sites, this is done in the equivalent of catalogs — catalogs that can be searched.
- **Search and discovery vehicles.** As part of this, not only must companies and agencies be able to manage their information in large databases, but citizens or customers must also be able to access and find that information. Therefore, effective search engines are crucial for e-commerce sites.
- **Electronic payment capability.** Secure systems must be available to allow citizens to pay for services and goods and provide a vehicle for consumer and citizen confidence in those systems. Beyond secure credit card systems (typically using Secure Socket Layer technology), new forms of electronic money (digital cash or e-checks) are being developed to ensure that money can be transferred smoothly and effortlessly between parties.
- **Provisions for secure systems — confidentiality, authentication of identity, and integrity of transactions.** Important requirements for any online transaction are for transactions to remain confidential, for all parties to be sure of the identity of all other parties, and for no one else to be able to interfere with those transactions. This means that some cryptographic system or a vehicle like digital signatures must be utilized.
- **Connectivity.** Systems need to be accessible and must contain adequate bandwidth or the capacity to handle the transfer of large amounts of information and communication.
- **Legal and policy context.** The entire policy universe surrounding e-commerce is continually evolving and changing. Some of the issues currently being decided in state legislatures and in the United States Congress involve digital

[3] *Adam, Nabil R.; Dogramaci, Oktay; Gangopadhyay, Aryya; Yesha, Yelena. 1999.* Electronic Commerce: Technical, Business, and Legal Issues. *Upper Saddle River, NJ: Prentice Hall PTR.*

signatures, privacy, intellectual property, and Internet taxation. The result of these legislative decisions will have an enormous influence upon e-commerce in both the public and private sectors in the near future.

The components described come together in e-commerce systems involving two arenas — business to consumer (B2C) and business to business (B2B). In each of these, websites typically utilize the following types of models that closely approximate traditional retail:

- **Simple Financial Transactions.** For simple financial transactions, most sites utilize a classic shopping cart model. Under this familiar model, shoppers select merchandise, "put" it into the shopping cart, take it to the "checkout counter," add their credit card number, and "check out" to actually purchase the merchandise.
- **Value-Added Services.** Websites that provide value-added services typically do so as a way to create a connection to that site and to that business and to perhaps even create community. Consumers sign up for notification of some activity or to receive additional information.
- **Aggregators or portals.** Aggregator sites gather together many vendors in one site in what becomes a shopping mall model for selecting from a variety of vendors and merchandise. Each vendor's catalog is available for search and discover and merchandise selection.
- **Auctions.** At auction sites, merchandise is available for consumers to bid upon and also to offer for bid. The technology allows the bidding process for each item to be allotted a given amount of time and records bids by each participant.

Digital Signatures

Digital signatures are the current technology that allows individual parties to enter into contracts with one another and signify assent online, without obtaining pen and paper signatures. Technically, digital signatures are the user's known data after the data, message, or document has been encrypted with a mathematical algorithm (which itself uses PKI [Public Key Infrastructure] cryptography).

This mathematical algorithm is known as the sender's private key, an algorithm to which only the sender has access. The sender sends along a related public key or has one on file with a certification authority (to which others have access). The public key decrypts the original sender's known data since the public key is mathematically related to the private key that has been used to encrypt the original material.

Digital signatures ensure that:

- The identity of both parties can be authenticated.
- Neither party is able to repudiate the transaction (say they were not the one who participated).
- Transmissions are secure and confidential.

To ensure the identity of the sender and other parties, digital signatures may be obtained from a certification authority. The certification authority, acting as a trusted third party, verifies an individual's identity using appropriate identity documents, etc. They then provide the digital signature and serve as the secure repository for public keys.

Individuals wishing to engage in a binding contract would register with a certification authority, verify their identity there, and purchase a digital certificate. If they were the sender, they would prepare their desired document, encrypt it with their private key, and send it to their chosen recipient. The recipient would then use the sender's public key to decrypt the documents.

The Electronic Signatures in Global and National Commerce Act of 2000 (E-Sign) legislation states that digital signatures must be allowed in transactions but does not limit the technology to any one found today.

Service and Innovation in the Private Sector

There is much that the public sector can learn from the pioneering efforts of the private sector in implementing e-commerce. In addition to providing basic transactions to customers over the World Wide Web, private firms have learned how to provide extra value on their websites to attract and retain customers. They are learning to provide additional value-added services and to create communities of members, not just one-time-only visitors. Successful sites combine online transactions with services and information like maps, databases, and interactive information that can be tailored to each individual's tastes and convenience, including 24/7 access (24 hours a day/seven days per week).

Examples of several e-commerce transaction models are described here; these models are already being applied to the public sector at an increasingly rapid pace. Other private sector sites with some possible relevance to the public sector are discussed below. Most of these sites have "click and mortar" strategies rather than just an online presence — they have "real" as well as "virtual" sites.

Simple Financial Transactions/ Classic Shopping Cart Model

Simple financial transactions are the most commonly found e-commerce sites on the World Wide Web today. These straightforward transactions allow consumers to access goods from each vendor's site at their own convenience — 24/7.

Amazon.com (www.amazon.com) is perhaps the premier example of a private sector site using the shopping cart model for straightforward financial transactions to reinvent the way that retail goods and services are provided. Beginning as an online book retailer, it now sells videos and many other goods. Among all digital media sites in April 2000, Amazon.com had the ninth largest number of unique visitors (14.174 million) (behind AOL, all Microsoft sites, NBC, and four portal sites).[4] "Any company that can wrap experience attributes around a commodity product or service has the chance to be an industry revolutionary."[5] In addition to providing a convenient site for simple transactions, it has also pioneered the delivery of value-added services. Among its most prominent features is its innovative third-party content — interviews with authors, reviews of books, prerelease information. Amazon.com also uses e-mail extensively to inform customers of order status and send out book reviews and notices of new books. Amazon.com also allows the user to establish wish lists of their favorite books.

[4] *Media Metrix, 2000. Media Metrix Top 50 US Web and Digital Media Properties for October 2000. Available at www.mediametrix.com/usa/data/thetop.jsp*

[5] *Kalakota, Ravi and Robinson, Marcia. 1999. E-Business: Roadmap for Success. Reading, Massachusetts: Addison-Wesley, p. 15.*

Value-Added Sites

Value-added sites are those that provide more than just the opportunity to purchase goods or services. Even if the user cannot directly purchase goods from the site, these companies offer the opportunity for some added value to be obtained from their websites. For instance, Federal Express users can track their packages through the FedEx site. Amazon.com users are e-mailed news of the latest books in their favorite reading categories and can access information on what those with similar interests are purchasing. Autobytel sends e-mail reminders of needed automobile maintenance services.

Federal Express (www.fedex.com). Federal Express provides numerous value-added services to its users. It allows account holders to track their packages and determine their status at any time, manage their accounts, and view and pay invoices. Users can determine the location of the closest drop-off point and then obtain driving directions. Users can also order service from the website by filling out and printing the waybill (using the address book features included) and then e-mail the recipient that the package is on its way.

J.C. Penney (www.jcpenney.com). J.C. Penney utilizes a "virtual model" to assist in shopping online. Although users may express shop, they may also create their virtual model and save information about their own sizes, body shape, and skin and hair coloring. Then the user clicks on one of a selected group of clothes to "try them on" the virtual model.

Gateway (www.gateway.com). The Gateway site provides another type of service for customers — the ability to customize their computer systems with the exact types of software and hardware configuration that they desire. It also utilizes membership and customized accounts on the site as another means of creating community and enticing consumers to return to the site, a strategy that many e-commerce providers are using. The ability to customize an order and receive special services has been an effective strategy for many companies.

Autobytel (http://www.autobytel.com). Autobytel is another company that uses this same strategy to enormous effect — in this case, providing customized services to its consumer members as well as the ability to search for particular makes and models of cars. Users can register their car (make, model, mileage), and the Smart Scheduler service sends (via e-mail) oil change and other service reminders, as well as reminders for insurance and warranty updates; automatically provides information about local dealers; and provides cost estimates (through their Auto Expert service) and quotes for specific automobile repairs or regular check-ups. In addition, potential car buyers can fill out a form online with the type of car for which they are looking, and Autobytel contacts dealers; the user is then notified by the dealer with an offer on that type of car — obligation free. For used cars, the consumer is notified by e-mail when the desired make and model of car is available.

United Airlines (www.ual.com). Like other airlines, United's website makes it possible for a customer to search available flight information for the best possible flights through interactive access to its reservations databases. Customers can also work with their frequent flyer accounts and make reservations, as well as inquire, in real time, as to the status of current flights.

Webvan.com (www.webvan.com). Webvan is one of the innovators in the field of grocery shopping by e-commerce. The site operates entirely on the shopping cart metaphor; the user can use a standard shopping list provided by Webvan or can go through the "aisles" (bakery, produce, meat and seafood) themselves. After making their selections, customers then arrange for a delivery time. This site is currently operating only in the San Francisco area, Sacramento, and the Atlanta area.

Portal Sites/Aggregators

Sites like **Yahoo** (www.yahoo.com), **Netscape** (www.netscape.com), and **Shop.Com** (www.shop.com) are so-called "portals" that bring together numerous vendors and content providers along with a vast amount of information and retailing opportunities. The goal is to provide one site to which users can go to obtain everything they need and want.

Lessons from the Private Sector

Several lessons from successful private sector e-commerce efforts can be identified:

1. Use a **familiar model for consumers** so that the site is easy to use. In most cases in the private sector, this model is a shopping cart.
2. Provide some **value-added service** related to the product or service *in addition* to the initial product or service.
3. One type of value-added service is **convenience**. This can mean either an easy way to find the "mortar" part of the "click and mortar" service or providing some information that the consumer would like to have but may not really know they would need — in other words, create a demand for their services.
4. Provide community or a way **to connect users to the site** and the company — get their names and email addresses, in any event.
5. **Customer service** is key. Sites that do not provide adequate customer service will have an exceedingly difficult time trying to survive.

Yahoo and Netscape are general portals that bring together news, the ability to track stock portfolios and other customized information, search engines, the ability to generate maps and driving directions, and more. Yahoo also provides yellow pages, the ability to search for new cars, jobs, and apartments, and connections to live audio broadcasts of sporting and other events. Through Netscape, users can listen to Internet radio, read movie reviews, and generate a customizable home page with weather, horoscopes, and stock information. Shop.com is a true e-commerce aggregator in that it is composed of retail sites organized into 13 different categories, including real estate and education.

Online Auctions

Online auction sites are another major type of e-commerce site. Auction sites provide users the opportunity to interact and bargain with others interested in buying and selling. They take advantage of the worldwide communications available through the Internet to facilitate these processes.

The premier online auction site is **eBay** (www.ebay.com). After registering with eBay, users may bid on items available or may put up their own goods for possible bid and sale to others. The site contains specialty areas for automotive bids, special collections, and business equipment as well as provides the opportunity to bid on everything from toys to stamps and fine art. eBay has also purchased and made available the goods on Half.com, a site that previously offered goods for half price.

These sites are excellent examples of how, in an amazingly short time, private sector companies have become extremely sophisticated in online marketing, branding, advertising, and retailing. However, this progress has not been trouble-free. By June 2000, many firms were going bankrupt and service delivery problems had emerged (one of the most well-known was Toys R Us, which was not able to make many deliveries to its Christmas customers in 1999). Since then, numerous e-commerce firms ("dot.com" firms) have closed their doors, run out of funds, or gone bankrupt. See "Lessons From the Private Sector" for useful advice for public sector agencies contemplating e-commerce ventures.

E-Government — Precursor to E-Commerce

Over the past 10 years, there has been a paradigm shift in the use of technology by governments. This began with the early use of microcomputers and mainframe computers to mechanize repetitive tasks and continued with providing services through electronic government applications such as computerized kiosks and smart cards.[6] Since then, government has made great strides in providing digital or e-government.

The movement to decentralized computing has directly led to the ability of citizens to access e-commerce directly from their desktop computers 24/7 and to the possibility of "Government on the Desktop" — providing e-government and public sector e-commerce applications at their fingertips. Without the creation of personal computers and the World Wide Web, this would not have been possible.

These rapid and revolutionary changes in the structure of information technology (IT) — hardware, software, and networking — occurred simultaneously with movements within the public sector to "reinvent" and "reengineer" processes and procedures throughout government. The result was that many governments were more poised to take advantage of the advances in technology to change their means of providing information and services to their citizens.

Primarily due to resource limitations and the inability to quickly recruit and retain IT staff, governments in general were slower to make use of the World Wide Web and its myriad and changing technologies than were private sector companies. From basic descriptive baseline data that has been developed,[7] as well as anecdotal and experiential data, it is clear that several basic types of public sector website activities developed, originally within several functional areas: economic development (tourist and business development) and procurement. These functional areas, along with the types of activities, have expanded to now include:[8]

- Information access and delivery
- Document access and download
- Interactive information access (online databases)
- Communication with officials
- Paperless document filing (online forms)

[6] *U.S. Congress, Office of Technology Assessment. 1993. Making Government Work: Electronic Delivery of Federal Services. (OTA-TCT-578). Washington, D.C.: U.S. Government Printing Office.*

[7] *Stowers, Genie N. L. "Moving Into A New Era of Cyberactivity: State and Local Governments on the World Wide Web."* Government Information Quarterly, *January 1999. "Cyber-Budgeting On the Web."* Government Finance Review. *February 1998.*

[8] *Stowers, Genie N. L. 1995. Citizen Service and the Superhighway.* The Public Manager *24 (3): pp. 15-19.*

- Interactive discussions
- Online mapping/Geographic Information System (GIS) Applications
- E-commerce applications
- Multimedia — streaming and playback

These functions can be seen in the three main stages of web development that are experienced by many public sector agencies:

- **"The Virtual Bulletin Board."** For some government agencies, their World Wide Web sites operate as nothing more than virtual bulletin boards — yet another place to post information about their agencies — and provide no interactivity or ability to provide services to citizens. Such sites focus on *provision of information*.
- **"The Web Reaching Out."** For even slightly more advanced and experienced agencies, their Web sites were quickly used as interactive communications sites. These sites offered information and, even in the beginning, provided e-mail or discussion areas. There was a clear emphasis upon reaching out to citizens through online participation. These sites focused upon *community building and communication* as well as *policy making*, as many jurisdictions sought to use their sites to enhance policy discussions on various issues.
- **"24/7 Service Delivery."** To date, the third stage — website as 24/7 interactive service delivery site — is still developing and emerging in all but the largest jurisdictions. This stage generally began with the provision of basic documents that could be accessed and downloaded by citizens. It continued on as the technology grew easier to use with basic online forms and paperless document filing. The next feature that typically emerged was allowing citizens and businesses to access online databases, ranging from basic telephone and e-mail directories to more sophisticated interactive databases like those used in purchasing. Finally, the technology for citizens to access and complete online, interactive transactions emerged. During this last stage of development, many agencies adopted basic and then more complex services and, in general, recognized their site's potential as a way to revolutionize the provision of services to their citizens.

E-Commerce Applications in the Public Sector

The Gartner Group estimates that government electronic service efforts will move from 1.5 billion transactions in 2000 to 6.2 billion in 2005. In the year 2000, the Internal Revenue Service expects to receive 33 million electronically filed individual tax returns.[9] Further, the hopes of many are placed on e-government and government e-commerce applications. At the state of Idaho's recent E-Government Boot Camp, former Alaska Chief Information Officer Mark Badger stated, "Government and democracy are meant to be reinvented over and over. And you are the parents of the new generation's democracy."[10]

Since governments obviously have limited goods to sell to the public or business (compared to the private sector), we would expect to see the most e-commerce applications in the areas where funds exchange hands — taxes, licenses and permits, and procurement. While most of the private sector activity on which these new efforts are modeled involves business-to-business service delivery, their experience with business-to-consumer activities can be used as a model to enhance public sector government-to-citizen activities as well as the current dominant government-to-business model.

Obviously, a significant difference between the public and the private sectors is that the public sector primarily exchanges information and does not always charge for the information, although some goods do exchange hands. The definition of e-commerce within the public sector must therefore rely upon not just the transfer of goods and services but must also include exchange of information and services.

Table 1 describes the various public sector e-commerce models. Like the private sector, there are four types of transaction models similar to those found in the private sector: simple financial transactions, vendor aggregations, value-added services, and auctions. In the public sector, there is an additional transaction model — the required submissions of documents and fees, which includes both business and citizen tax filings and fees. These transactions involve three types of interactions: G2C (Government to Citizen), G2B (Government to Business), and B2G (Business to Government). Governments sell goods and information directly to citizens (G2C) and they sell some items and information directly to business (G2B). They also buy directly from business (B2G) and often assist in the organization of these vendors in order to improve purchasing processes. There is no private sector

[9] *McClure, David L. 2000. Electronic Government: Federal Initiatives are Evolving Rapidly But They Face Significant Challenges. Washington, D.C.: U.S. General Accounting Office (GAO/T-AIMD/GGD-00-179).*

[10] *Badger, Mark. In Information Management Resources Council, State of Idaho. 2000. Info Tech News. Available at www2.state.id.us/itrmc/bcamp/btcprpt.pdf, September 2000, p. 1.*

Table 1: Models and Examples of E-Government and E-Commerce

Types of Models/Type of Interaction (Below)	Simple Financial Transactions	Required Submissions of Documents and Fees	Vendor Aggregations	Value-Added Services	Auctions
G2C (Government to Citizen)	Financial transactions/ shopping cart (birth and death certificates)	Individual tax filings and payments	One-stop licensing and permitting areas	Notification of zoning applications	Auctions of surplus goods
G2B (Government to Business)	Financial transactions/ shopping cart (census data, GIS data, maps)	Business and corporate tax filings and payments	One-stop licensing and permitting areas	Notification of zoning applications/ could include notification of regulatory changes	Auctions of surplus goods
B2G (Business to Government)	Simple purchases		DoD EMALL/ MultiState EMall	Could include notification of regulatory changes	

counterpart to the B2G model; it is necessary here to describe the efforts of vendors to sell directly to government agencies and jurisdictions.

These new privatization efforts have enormous repercussions for the public sector, partially since they are happening so quickly. In fact, a "digital divide" has developed among public sector jurisdictions. The larger jurisdictions (states, large cities) are moving rapidly ahead and are among the most innovative, paving the way for the others. This leaves smaller jurisdictions behind in the movement toward online service delivery and government e-commerce applications.

While one of the benefits of private sector e-commerce is the ability to stretch beyond geographical boundaries (to reach globally), by definition public sector jurisdictions are confined to their own geographical boundaries. With a potential worldwide market from which to benefit, private sector firms are able to take advantage of the newest technologies. They can be staffed to maintain their websites with the absolutely newest information, designs, security, and transaction methodologies.

Governments, however, serve only their own citizens — a limited number — and a limited geographic area, not a worldwide market. Except when jurisdictions are large enough (states), this makes e-commerce less efficient than for private sector firms. It is more difficult to earn benefits over a broader scale and scope of customers. Smaller jurisdictions cannot take advantage of economies of scale and positive externalities.

Governments also have additional constraints. These include the absolute need for confidentiality of client information, the need to be accountable to their citizenry, the duty to provide access to all (not just those with discretionary income), and the duty to provide public rather than private goods. Because of these restrictions, governments have moved more slowly toward e-commerce than the private sector, and e-commerce transactions are more likely to be found on only the larger public sector websites like

those of federal agencies, states, and large cities. However, in a very short period of time, some of these federal agencies, states and cities have developed extremely innovative applications that provide useful services to the public.

Public Policy Context

The federal government is making perhaps the most consistent progress implementing e-commerce applications of any level of government. Thanks to several pieces of legislation, executive orders, and other policy direction, many federal agencies are coordinating efforts. "Federal Policy Context" describes some of the more important legislation and policy memoranda that have impacted this development.

The Information Technology Management Reform Act of 1996 (also known as the Clinger-Cohen Act) set the stage by forcing the appointment of a chief information officer (CIO) for each federal agency who would be responsible for the coordination of agency technology efforts, including the change in mind-set required by a shift to e-government and e-commerce applications for government.

Congress then passed the Government Paperwork Elimination Act of 1998 (which followed the Paperwork Elimination Act of 1995); this act further moved the government toward e-government by requiring federal agencies to allow individuals to use electronic means to submit information or make transactions and to keep records electronically. It also encouraged federal agencies to utilize electronic signatures to facilitate e-government transactions. Once instructed to reduce paperwork and now having the technology available to provide services online, the natural strategy was to move toward e-government and e-commerce applications. If grant proposals, benefit applications, and other transactions could be conducted online, this would definitely lead to the reduction of paper.

These important pieces of legislation were followed by a Memorandum on "Electronic Government" from President Clinton on December 17, 1999. This resulted from activity by the President's Management Council's Electronic Processes Initiatives Committee. In March 1998, they published "Electronic Commerce for Buyers and

Federal Policy Context

Information Technology Management Reform Act of 1996 (also known as the Clinger-Cohen Act). This act created Chief Information Officers for each federal agency and set out some requirements for federal procurement.

"Framework for Global Electronic Commerce," White House, 1997. This document was the first that provided guidance and support for private companies and federal agencies to engage in electronic commerce.

Government Paperwork Elimination Act of 1998. The GPEA of 1998 laid the groundwork for the Department of Defense innovations in public sector e-commerce by saying that electronic means and information technologies should be used to help streamline government processes and reduce paperwork.

President's Management Council's Electronic Processes Initiatives Committee, March 1998, "Electronic Commerce for Buyers and Sellers: A Strategic Plan for Electronic Federal Purchasing and Payment." This plan was one of the very first to lay out goals and strategies for actual public sector e-commerce activities.

Fiscal Year 1999 DoD Authorization Act. The Department of Defense Authorization Act required that the DoD create a one-stop shopping site online where vendors and their goods could be consolidated.

Memorandum on "Electronic Government" from President Clinton on December 17, 1999. A further policy statement laying out important principles for federal government involvement in e-commerce. This included encouraging the private sector as well as utilizing these technologies within public sector agencies.

Digital Signatures (E-Sign) — 2000. While not prescribing the actual technology to be used, this federal legislation says that a sound, symbol, or process may serve as a type of digital signature rather than pen and paper signatures.

Sellers: A Strategic Plan for Electronic Federal Purchasing and Payment." This document laid out policy principles and the components that would be crucial to the development of e-commerce applications by the federal government.

These policy principles include:

1. "Make the buying and paying process easier and more efficient;
2. Facilitate best value buying and paying;
3. Take advantage of proven commercial applications;
4. Outsource transaction processing;
5. Assign financial liability based on ability to manage risk;
6. Monitor investments for return; and
7. Manage the change process."[11]

More specifically for the U.S. Department of Defense, the 1999 DoD Authorization Act required that the Defense Department implement an online mall that aggregated vendors and their goods into one place for Defense purchasing agents.

Then, in 2000, the Electronic Signatures in Global and National Commerce Act ("E-Sign") (Public Law 106-229) was enacted by the Congress. This legislation instructs federal agencies to eliminate any legal barriers to the use of electronic technology to form and sign contracts, collect and store documents, and send and receive notices and disclosures. In other words, E-Sign authorized the usage, after October 1, 2000, of digital signatures in most government transactions.

[11] *President's Management Council's Electronic Processes Initiatives Committee. 1998. "Electronic Commerce for Buyers and Sellers: A Strategic Plan for Electronic Federal Purchasing and Payment." March 1998: p. vi.*

Models and Examples of E-Commerce in the Public Sector

The public sector has already developed many e-commerce applications. The precursor to e-commerce in government is the development of interactive online services, or e-services, by government. There are many different types of financial transactions possible in the public sector, and governments have already been doing an admirable job of providing access to these in an online environment. Taxes, fees, permits, and purchasing opportunities are all examples. Online examples of these services are provided below.

Simple Financial Transactions/Classic Shopping Cart Model

Government simply does not engage in as many straightforward financial transactions as does the private sector, but there are some examples of how public agencies are utilizing e-commerce technologies to simplify government services for their citizens.

Purchase of birth or death certificates online

One crucial financial transaction in which citizens interact with their governments is the purchase of certificates — birth and death certificates in particular. In Mississippi, Vitalchek (www.vitalchek.com) is an outside contractor providing the technology and setup for these transactions.

Online license and permit fee payments

Online fee, permit, and license payments are another type of e-commerce application for governments, as they are one of the most frequently used services in which citizens pay their governments a fee. There are already many applications available in this area and many more being developed — particularly with the advent of the gov.com private sector firms.

- Connecticut has a complete online licensing center, the Connecticut Licensing Info Center (www.ct-clic.com). This site currently provides searchable information on over 900 licenses, permits, and registrations, has downloadable forms, and is planning to provide interactive order forms online.

- Alaska has online licensing for fish and game licenses at www.admin.adfg.state.ak.us/license; users use their credit cards to purchase a license.

Online driver's license and vehicle registration renewals.
States like Massachusetts, California, Indiana, Louisiana, Michigan, New Mexico, New Jersey, and North Carolina all provide citizens the ability to renew their driver's license online.

- Once they have their registration renewal form and credit card, Louisiana's Express Lane allows users to renew their vehicle registration on online at www.dps.state.la.us/omv/home.html. Users enter the information about their car, the appropriate fee is calculated and viewed, the fee is paid via the credit card, and the receipt is printed out.
- Massachusetts was one of the innovators in the area of providing e-commerce services to citizens. Their Express Lane services (www.state.ma.us/rmv/express) provide users with the ability to complete a wide variety of motor vehicle-related tasks — change their address, renew registrations, request duplicates, order special license plates, or pay their citations online. Users pay with a credit card for these services through a site providing a secure system of transactions.
- California also now allows drivers to renew their vehicle registration online using a credit card (www.dmv.ca.gov/online/vrir/vr_top2.htm).

Online Tax Submission
Several states have developed and implemented online tax submission applications.

- In a public/private partnership (www.tax.gov/elect.htm), five states are working with the STAWRS (Simplified Tax and Wage Reporting System) application to allow users to pay federal or state taxes (in North Carolina, Maine, Maryland, Oregon, and Montana).
- Colorado citizens use the Netfile system to allow users to file their taxes (www.netfile.state.co.us), which more than 30,000 citizens took advantage of in 2000.
- Delaware also allows their citizens to file taxes online (dorweb.revenue.state.de.us/scripts/if/if99.dll).

Aggregators of Vendors — Shopping Malls
There are several major procurement projects in the public sector involving vendor aggregator sites. One project is the U.S. Department of Defense's EMALL, a collection of sites brought together with a common database and user interface. A full case study of the EMALL will be presented later in this report. Another is the Multi-State Emall project initiated by Massachusetts and joined by five other states; this project will also be discussed later in more depth. These types of e-commerce applications in which public sector agencies work together have enormous potential for dollar savings and productivity improvements.

Auctions of Government Surplus Goods
Some jurisdictions and private providers are experimenting with the use of online auction technologies to get rid of surplus government goods. The U.S. General Services Administration is planning an online auction site (www.GSAAuctions.gov) at which surplus property could be sold. To accomplish this, they have hired American Management Systems Inc., an outside contractor.[12] A so-called dot.com company (a private sector firm offering e-government services), gov.com, offers government property for auction on the Internet at www.govworks.com/auction. This allows users from all over the world to bid on surplus property from governments across the country. Although not many goods are available, a recent offering showed 68 three- to six-year-old laser printers available, with bids starting at $2,500 and an estimated market value of $10,000. Although the item had been viewed 734 times, there were no bids. In another category, a metal lathe previously used in a high-school metalworking class showed two bids, one from North Carolina and one from Oregon.

Value-Added Services
Illinois has an electronic subscription service to facilitate the purchasing process. When contractors subscribe to the service, they receive reports,

[12] Federal Computer Week. *2000. GSA Holding Online Garage Sales. May 15, 2000. Available at www.fcw.com/fcw/articles/2000/0515/web-gsa-05-15-00.asp.*

bulletins, and bidders' lists from the Illinois Department of Transportation via e-mail (www.dot.state.il.us/senv.subsc.html). This service does directly support and facilitate the state's commercial activities and companies that do business with the state.

Online Premium Services Areas
Several governments have established password-protected premium service areas that provide services, information, and e-commerce activities for a fee. One example is Access Indiana's Premium Service (www.state.in.us/premium/index.html) site, where citizens may utilize databases and information for an annual subscription fee. Other states that offer this are Nebraska (www.nol.org), Virginia (www.vipnet.org/vipnet/premium.html), and Georgia (www.ganet.org/index/ECGeorgia.html), where registered users can also be billed on an monthly basis.

Government Portal Sites
Government portal sites bring together many services and agency websites onto one site. The premier government portal site is to be the federal site, FirstGov (firstgov.gov), proposed by President Clinton and launched in October 2000. FirstGov is a project of the President's Management Council and will be maintained by the U.S. General Services Administration. Designed as a multiple-page portal and comprehensive search engine for all federal websites, this site brings much anticipated organization, ease of use and access to a complex picture. Complete with databases, the site is currently conceived as a public-private partnership.

Reverse Auctions

To learn more about reverse auctioning, please see the previous Endowment report: "The Auction Model: How the Public Sector Can Leverage the Power of E-Commerce Through Dynamic Pricing." In this report, Professor David C. Wyld explores the challenges facing public sector managers in implementing dynamic pricing concepts (reverse auction).

To download or order a copy of this report, please visit The PricewaterhouseCoopers Endowment for The Business of Government website at: endowment.pwcglobal.com.

Case Studies

Four case studies are presented in this report. They were not randomly selected but were chosen based upon the lessons that could be derived from the experiences of each one.

- The **City of San Carlos, California**, highlights how a small jurisdiction can utilize resources creatively, build partnerships, and become an important innovator. This case also illustrates the necessity for a jurisdiction to have experience providing basic Internet and web services before branching out into the more complex e-commerce applications.
- The **Washington State** points to the importance of adequate strategic planning in developing an e-commerce presence.
- The **Commonwealth of Massachusetts** was selected because of its leadership among public sector e-commerce applications and its progress in developing a supporting policy context for these activities.
- The **U.S. Department of Defense's e-commerce** projects like EMALL and others illustrate not just what is possible with leadership but also the importance of an underlying policy context for enabling e-commerce applications in government.

Each case was developed based upon primary data and research, interviews, examination of primary documents, and the author's experience with the agency's websites.

From E-Service to E-Commerce: San Carlos, California

One of the most important lessons of public sector e-commerce activity is that agencies and jurisdictions must have successful experience and know-how with e-services before moving on to more complex e-commerce activities. Since the beginnings of the Internet, San Carlos, California, has been one of the most consistent innovators among governments utilizing the Internet. It was the first city named Best of the Web for Local Governments in 1997 and has since received numerous awards for its online activities and innovations. San Carlos represents an excellent example of a jurisdiction developing an Internet presence, electronic service delivery, and now e-commerce activities in stages. It is also an excellent example of what can be done by small communities and agencies working in partnership with others in their area. In general, San Carlos has a reputation and an internal culture of fostering innovation.

San Carlos, California, is a small community of 28,750 (as of January 1999)[13] nestled in the heart of Silicon Valley. It has a council-manager form of government with 100 full-time employees and another 50 working part-time. San Carlos initiated its web presence in early 1994 (as the second city with a site on the World Wide Web) and has continued that early involvement with a phased-in development approach that has never overesti-

[13] *California County Profiles, California Department of Finance. 1999. Available at www.dof.ca.gov/HTML/FS_DATA/profiles/pf_home.htm.*

mated city resources or the ability of the community to incorporate this new resource. The site began with one single page and has now grown to over 500 pages, with a potential for much more.

Brian Moura, the assistant city manager — the driving force behind San Carlos' web presence — and his team are currently working toward a content management system with content in a backend database and templates for city employees to input data into the site. The city has never managed its own site; it has always leased space on a server managed by the Association of Bay Area Governments (ABAG). Starting in 2001, San Carlos will have its own web server and will be managing its own site.[14]

Today, the website has the same basic graphic design as when it first began, one that is consistent throughout the entire site. The website was a smooth transition since the city was already experimenting (in 1993) with using hypertext and putting brochures and other information online in gopher format. The city worked with America Online and CompuServ to put up a system where citizens could download zipped files with government or community information from dedicated sites. From there, it was a natural next step to move that information into hypertext format and put it onto the World Wide Web once the Mosaic browser had been created.

To do this, in 1993 the city developed a partnership with ABAG, which was trying to encourage San Francisco Bay Area governments to put information on the web. ABAG provided website space and even one-page sites for local governments, and agreed to provide space and expertise to San Carlos. ABAG's efforts paid off — approximately 80 percent of Bay Area governments currently have some web presence. This was deemed important to San Carlos, since even in 1993, a survey by the school board found that two-thirds of all households had computers.

Beta versions of an online permitting system began in late 1998; the system went online in May 1999 and additional elements were added six months later. As with other components of the San Carlos site, the permitting system began with a small beta test and grew component by component. This particular system grew out of a very popular permit by fax system, which was also an innovative approach by San Carlos, one of the first jurisdictions to use such a system. At the peak of this system, 60 percent of all permit applications came by fax. Because of this system, the city had pioneered the use of credit cards for payment by the early 1990s, so was well poised to take advantage of the real-time elements of online web systems.

This system allows a user, in real time, to access and add information to San Carlos's database of citywide permits. The back end of the system is the city's permit database. In November of 2001, parcel and zoning information will be added so that users will be able to view all information about a parcel and its zoning anywhere in the city. Upcoming plans include the ability to do electronic plan submittal and to access GIS information from the website. In order to develop this system, San Carlos took advantage of a California League of Cities program that matches retired government managers with cities in need of specialized services and advice. In this case, San Carlos received the services of a retired city building official from Oakland who had to develop innovative methods for providing fast service after the 1991 Oakland firestorm destroyed parts of the city.

Many lessons were learned that could be applied to other jurisdictions in their efforts:

- **The importance of marketing new online services.** According to Assistant City Manager Moura, without adequate marketing, citizens will not participate. It is not simply a matter of "build it and they will come"; citizens must be educated and informed about services and how they can benefit. In the case of San Carlos, Moura did a "traveling road show" to groups like the Chamber of Commerce and Board of Realtors. These presentations were made in the beginning of May 1994 and whenever major changes were made to the site.
- **The importance of adequate flexibility of information technology staffing to hire staff quickly.** Assistant Manager Moura obtained the authority to move a person quickly from

[14] *Personal Interview with Brian Moura, City of San Carlos, June 15, 2000.*

private sector consultant to city employee as the need arose. This was particularly critical for a jurisdiction in the heart of Silicon Valley, where Internet firms were rapidly hiring any skilled personnel.

- **The importance of adequate training for information technology/web design personnel.** Without constant training and updating of skills, employees will swiftly fall behind. In a field changing so rapidly, this would create a significant problem. Therefore, all efforts must be made to ensure that employees are given opportunities to continue to update their skills.
- **The importance of adequate experience in providing e-services before moving into e-commerce applications and more complicated interactive services.** Rather than moving directly to the more complex and challenging tasks like e-commerce applications, jurisdictions should develop experience with the more basic e-government services, which, in turn, develops an audience among their citizens.

Strategic Information Technology Planning: The State of Washington

The state of Washington has taken a comprehensive strategic planning approach to providing digital government to their citizens, incorporating landmark benchmarking and performance measurement systems as well as cutting-edge e-commerce and other information technology into its comprehensive web services. As stated in its Digital Government Plan, "The state's successful transition to digital government is based upon careful, coordinated planning to ensure interoperability, ease of use, security, and the wise investment of taxpayer money. To get there, the architects and builders of digital government must take an approach that treats the state, with all its various components, as a single enterprise. This approach is based on a 'build it once' policy in which agencies avoid duplication of effort, adhere to common standards, and utilize a common infrastructure in order to serve the citizens in a seamless way."[15]

Washington believes that digital government has many benefits for its citizens. Based upon information from private sector firms and other governments plus its own analyses, it believes that providing the ability to conduct routine transactions on the web is cost-effective. In addition to actual cost savings, it also allows agency staff to focus their time on the non-routine cases rather than spending time on the many routine transactions. "Digital government holds the promise of automating volumes of routine transactions (broadly defined to include applications, filings, and information requests) while focusing agency employees on those interactions that require individualized attention. Not only does this allow government to be more efficient, it allows government to be more attentive to the individual citizen — both online and offline."[16] The intent is not to have digital government ever replace traditional ways of providing services; the aim is to reengineer but not replace these services.

The task of developing and providing these services has been delegated to the Information Services Board (ISB), an entity created by the state legislature. The ISB has developed a plan that includes the provision of online services through one state Internet portal in several stages of development. The board asked strategic questions such as:

- "What does the public want, need, and expect?
- What do small business owners really want?
- How much are they willing to pay for the services?
- How much is it going to cost to develop and support the service?
- Who will invest in the venture?
- What do they expect in terms of return on investment?"[17]

The Washington approach is to recognize and coordinate the three major components of digital government: Internet applications, infrastructure, and public policy developments. Developments in each of these three areas are coordinated and staged in so that overall efforts are integrated and intercept one another.

[15] *Washington Information Services Board. 2000.* Washington State Digital Government Plan. *Olympia, Washington: p. 8. Available at www.wa.gov/dis/e-gov, p. 10.*

[16] *Ibid., p. 8.*

[17] *Ibid., p. 10.*

The Internet applications are targeted for external Government to Business or Government to Citizen or for internal Government to Government use. Infrastructure elements that are being developed include:

- The portal itself as the primary access point into government information and services
- Secure access Internet service
- Security elements
- Methods of utilizing secure digital signatures and e-payments
- A digital archive
- The all-important help desk

For government, the policy efforts are just as important as the technological issues. These include security issues, e-payments, universal web design efforts (to create one overall "look and feel"), and efforts at creating technology standards and establishing appropriate architecture.

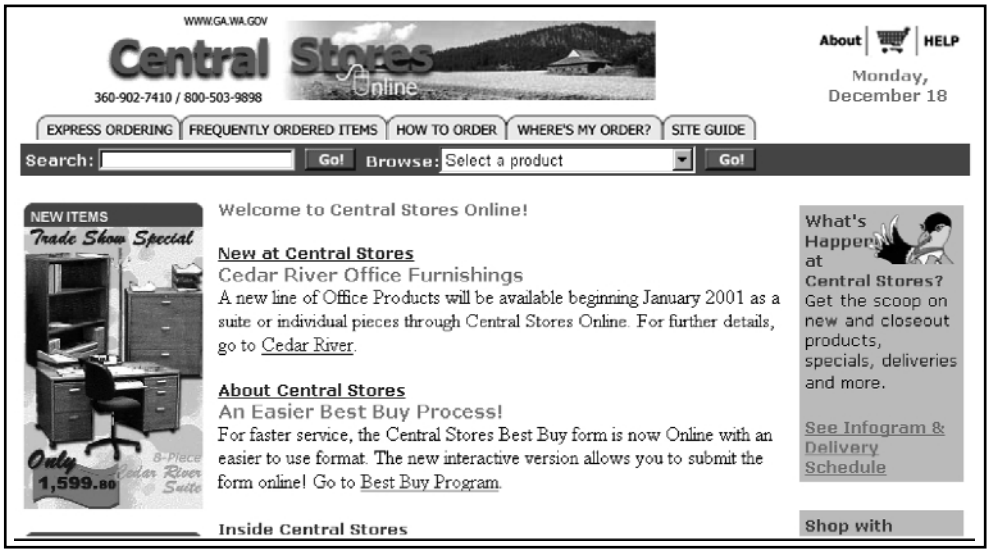
Their attention to strategic planning and policy development have served the state of Washington quite well. It was awarded the Progress and Freedom Foundation's award for Digital State three consecutive times — in 1997-1998 (the first award given), 1999, and in 2000.

On its own site, efforts have led to a coherent, cohesive presentation. The online services are clearly identified by a separate icon on the home page — an important feature for citizens trying to find their way around a large and complex website.

Under this icon are arranged numerous online e-commerce services. Using the Vitalchek vendor service, Washington offers citizens the opportunity to order and pay for birth and death certificates online. Using electronic funds transfer, businesses can pay their excise taxes and industrial insurance premiums online. Citizens and businesses may order and pay for publications from the site (both G2B and G2C) and may register online to get rid of their surplus property. Moorage permits may be purchased online to allow citizens access to space at docks and floating buoys.

One of Washington's most important services is Central Stores Online. Using standard e-commerce technology (shopping carts, express ordering, and frequently ordered goods), state employees can easily purchase items from Washington's Central Stores Online (www.ga.wa.gov/centralstores). At this well-organized site (see Figure 1), which appears like any private sector e-commerce site, items are featured for sale and new items are highlighted. Standard features include express ordering, special lists of frequently ordered items, the ability to track orders, order acknowledgement, and

Figure 1: State of Washington's Central Stores Online (E-Commerce Site)



customer service assistance that includes tips on how to order and prominently displayed contact information. An important value-added customer service is the PUSH program, which takes one order as the standard and sends it automatically to the purchaser without any further action. This is the type of convenient service that the private sector does so well in their e-commerce activities that the public sector is just beginning to include.

Lessons from the Washington experience include:

- **The importance of strategic planning.** The immensity of the resources and time required to engage in these changes required the state to plan carefully. The state of Washington leveraged a careful planning process into a successful service delivery and e-commerce application implementation.
- **The importance of asking the right strategic questions and of considering the customer/citizen first.** Before proceeding with their online service delivery and e-commerce applications, the state of Washington developed a strategic plan complete with direct strategic questions that focused on the needs of the end users. This emphasis upon the end user/citizen and citizen/customer service is apparent throughout their site.

Commitment and Partnerships: The Commonwealth of Massachusetts

The Commonwealth of Massachusetts was one of the first states, if not the first, to engage in e-commerce service delivery to its citizens. Part of this innovation was due to the early support from both the governor (who chaired the Task Force on Electronic Government) and the lieutenant governor, as well as all of the Commonwealth's chief information officers. The commitment of the Commonwealth to information technology is also exemplified by two bond issues for IT expenditures in 1992 and in 1996; funds from these bonds allowed the state to meet many needs and move ahead in new directions. These funds helped to pay for MAGNet, the Massachusetts Access to Government Network, which provided most state agencies with high-speed, centrally managed TCP/IP connections. Even in 1998, 80 state agencies had websites and the web server managed 3 million monthly file requests, clearly one of the most active systems during that period of development of e-government.

The Commonwealth's chief information officer also created an Online Government task force; the March 1998 final report of this task force contained guidelines for the Commonwealth to follow in implementing e-government. The task force outlined several desired characteristics for government "on-demand": that it be navigable, rapid, consistent, reliable, and responsive for a business partner of the Commonwealth, for an organization doing business with the Commonwealth, and for citizens of the Commonwealth.[18] The task force outlined the following Online Government Guiding Principles:

- "Create no new regulatory or bureaucratic apparatus (eliminate existing apparatus where possible)
- Target initial resources toward the best business case for technology, not just the neatest technology
- Target security resources to what is needed for a given system — rather than the maximum for all systems
- Avoid direct competition with private sector providers of service or products
- Design and build solutions that promote a 'single face' of government (at all levels of government)
- Implement solutions that leverage users' existing private electronic commerce practices and technology
- Develop, organize, and present online data and processes to suit the citizen or business, not government"[19]

Massachusetts has made an explicit commitment to government reform and streamlining through information technology and e-commerce. For FY 2000, the state spent $220,717,578 on IT gross operating expenses and $81,413,449 on

[18] *Commonwealth of Massachusetts. 1998.* Online Government in Massachusetts: A Report of the Massachusetts Online Government Task Force. *Executive Office of Administration and Finance.*
[19] *Ibid., p. 6.*

gross capital expenditures. For FY 2000 (through 8/10/2000), it expended $1,785,605 just on its e-commerce activities.[20]

Massachusetts' Express Lane was one of the first, if not the first, e-commerce applications developed for the web. The system, which went online in July 1996, allowed users to pay driving and parking citations, renew automobile registrations, order special license plates, or request duplicate registrations. After selecting the service desired, the user entered credit card information; this information was protected by Secure Socket Layer (SSL2) technology to provide confidentiality. By March 1998, 32,000 users had used this application.[21] By the end of the summer of 2000, more than 100,000 people had been served and more than $4 million in fees had been collected.[22]

Massachusetts also sponsored an ambitious project with six other states (Idaho, New York, South Dakota, Texas, Utah, and Washington) called the Multi-State E-Mall project. This project, billed as "the nation's first live, open, standards-based e-marketplace in the government sector that directly connects buyers with suppliers,"[23] was piloted over an 18-month period, beginning in 1998. The primary consultants on the project, Intelisys Corporation and SAIC, estimated that administrative costs were reduced by 72 percent, and that the states were able to obtain better prices and reduce both delivery times and the time required to process a purchase order.[24] Massachusetts announced in March 2000 that the project would be expanded to 154 Commonwealth departments, 351 cities, and other public agencies. All 1,000 approved contractors are eligible to participate.[25]

Massachusetts also allows its citizens several options for filing their individual income taxes — TeleFile (by telephone), PC File (through their own home computers), Electronic Filing (filing made online through approved preparer), and Online Filing (again, users may file online through an approved tax preparer). For FY 1999, approximately 800,000 returns (25 percent of total returns) were filed through some electronic means.[26]

Lessons from the Massachusetts experience include:

- **The importance of collaboration in developing new initiatives.** The Multi-State E-Mall was an important but immense undertaking. Massachusetts wisely sought partners from other states before beginning the project. Given the limited geographic scale of many public jurisdictions and the high up-front costs of e-commerce applications, developing projects in concert with other public and private entities is a sound strategy that creates both savings and productivity gains.

U.S. Department of Defense One-Stop Shopping Site: EMALL

The U.S. Department of Defense (DoD) has perhaps moved the farthest toward implementing e-commerce applications. This movement followed a steady development of federal and department policy and procedure development in this area. The Government Paperwork Elimination Act of 1998 (and the earlier Government Paperwork Elimination Act of 1995) set the agenda for this DoD effort, which was further conceptualized as not just a way to reduce paperwork but also to enhance efficiency and streamline the much-maligned purchasing process within the Defense Department.

To this end, Secretary of Defense William Cohen generated several Defense Reform Initiative Directives (DRIDs) on the procurement process,

[20] *Commonwealth of Massachusetts. 2000. Information Technology Bulletin. Preliminary FY 2000 IT Spending, Summer 2000. Available at www.state.ma.us/itd/spg/publications/bulletins/summer2000/prelim_fy2000.html*

[21] *Commonwealth of Massachusetts. 1998.* Online Government in Massachusetts: A Report of the Massachusetts Online Government Task Force. *Executive Office of Administration and Finance, p. 16.*

[22] *Commonwealth of Massachusetts. 2000. Information Technology Bulletin. Online Government in Massachusetts, Summer 2000. Available at www.state.ma.us/itd/spg/publications/bulletins/summer2000/online_government.html*

[23] *Commonwealth of Massachusetts. 2000. Information Technology Bulletin. The Commonwealth of Massachusetts Multi-State EMall, Summer 2000. Available at www.state.ma.us/itd/spg/publications/bulletins/summer2000/multi-state_emall.html*

[24] *BB&T Capital Markets Equity Research. 2000. Business-to-Government/Government-to-Consumer Internet: E-Government — The Revolution is Here! Richmond, VA: BB&T Capital Markets, p. 14.*

[25] *Civic.Com. 2000. Attention Shoppers: E-Mall Expanding. Available at www.civic.com/civic/articles/ 2000/ 0320/ web-lemall-03-20-00.asp*

[26] *Commonwealth of Massachusetts. 2000. Information Technology Bulletin. Online Government in Massachusetts, Summer 2000. Available at www.state.ma.us/itd/spg/publications/bulletins/summer2000/online_government.html*

including #32 "Paperless Contract Closeout" and #47 "End-to-End Procurement Process." These directed that a working team be established to develop a revised "end-to-end" procurement process that incorporated a shared data environment. Then, the 1999 DoD Authorization Act specifically required that the Defense Department implement an online mall that aggregated vendors and their goods in one place for Defense purchasing agents and would allow a single view, access, and ordering capability for all available electronic catalogs.

These developments led to the creation of the DoD Electronic Business/Electronic Commerce (EB/EC) Program and a Joint Electronic Commerce Program (JEPCO) in the Department of Defense under the Defense CIO. JEPCO defines its vision as to "provide department-wide world class electronic commerce services resulting in reduced operational costs and process cycle time."[27] After the development of a strategic plan,[28] JEPCO began developing various e-commerce projects and working toward a common hardware, software, and protocol architecture for all of their efforts. The planned projects included the End-to-End Procurement project, paperless contracting, central contractor registration, and the DoD EMALL, the subject of this case study.

EMALL

The EMALL is a "one-stop shopping" site composed of three separate shopping corridors — Parts and Supplies, Training, and Information Technology. As a site, it provides B2G services and went online officially in May 1998 as part of an effort to streamline the purchasing process and provide a shared data environment throughout the entire procurement process. The EMALL concept of operations is to be a "single entry point for DoD customers to find and acquire off-the-shelf, finished goods and items from the commercial marketplace and Government sources."[29] To accomplish this, the project has five objectives:

- "To utilize the Internet's market space
- To provide one single access point through which a Department of Defense user could enter and shop in all of the stores and catalogs available to the department
- To allow the user to search for items across all stores and so enable price and other comparisons
- To allow the user one site where they could view the status of all of their orders
- To enhance the use of the Department of Defense's Purchase Card program, since this is allowed at the EMALL"[30]

EMALL provides one site where Department of Defense workers (as well as some other federal agencies) can purchase parts and supplies and information technology goods from 23 separate catalogs of suppliers. In addition, another 330 suppliers have direct delivery contracts and pre-negotiated contracts that are connected to the EMALL system. Sources for these vendors include the DoD Commercial Distribution System, the DoD Distribution System, and items found On Demand (specific items that are frequently used, and so are kept on hand). In addition, users have access to the vendors and goods from FedCenter.com (www.fedcenter.com), with another 200 vendors. There are still other Defense Department online shopping areas operating, but EMALL hopes to integrate all of them into its system in the near future.[31]

Users can search for particular items across all of the vendor catalogs, add a particular good to their shopping cart, save the cart's contents and come back to the site later; users can also save their shopping lists. They can then enter their order through the site and use their credit card or Purchase Card to make the purchase. For specific types of items, express ordering and quick lists of typical and repetitive purchases are also available (including, for example, chaplain books and goods). The database catalogs are managed by the vendors themselves, which saves an enormous amount of time and cost while still providing enormous benefits to Defense users.

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[27] *Joint Electronic Commerce Program Office, 1999. DoD Electronic Business (EB)/Electronic Commerce (EC) Architecture Town Hall Meeting Minutes. Available at www.acq.osd.mil/jecpo/ecip/town_hall_meeting.htm*

[28] *Joint Electronic Commerce Program Office. 1999. DOD Electronic Business/Electronic Commerce Strategic Plan, Available at www.acq.osd.mil/jecpo/download/pdf_files/eb-ecstrategicplan.pdf*

[29] *Joint Electronic Commerce Program Office. 2000. Standard EMALL Briefing (PowerPoint format). Available at www.emallmom01.dla.mil/scripts/info/learn.asp, August 2000.*

[30] *Ibid.*

[31] *Personal Interview with Gabrielle Zimmerman, Deputy Program Manager, EMALL. August, 2000.*

Figure 2 describes the distributed architecture that makes this system possible. Registered users enter the site through the DoD EMALL web portal (www.emallmom01.dla.mil/scripts/ default.asp) through Secured Socket Layer technology (for security purposes) and their log-in is verified. The same server serves as the order management server; another server serves as the search engine server and eBroker for all of the catalog databases from the various vendors. The Defense Logistics Agency requisition and ordering system is also connected to the system. Encrypted e-mail and ordering is used to transmit orders and information.

Approximately 2.8 million National Stock Number (NSN) items are available through the online electronic inventory catalogs seen on the EMALL (out of a possible 4.1 million NSNs); over 360,000 commercial part numbered items are available through contracts specifically written for the DoD EMALL.[32] There are currently 2,300 registered users, with 800 of those currently actively using the system. Sales have exceeded $3 million in FY 2000 through September; when including the other DoD systems soon to be included with EMALL, sales exceed $80 million.[33]

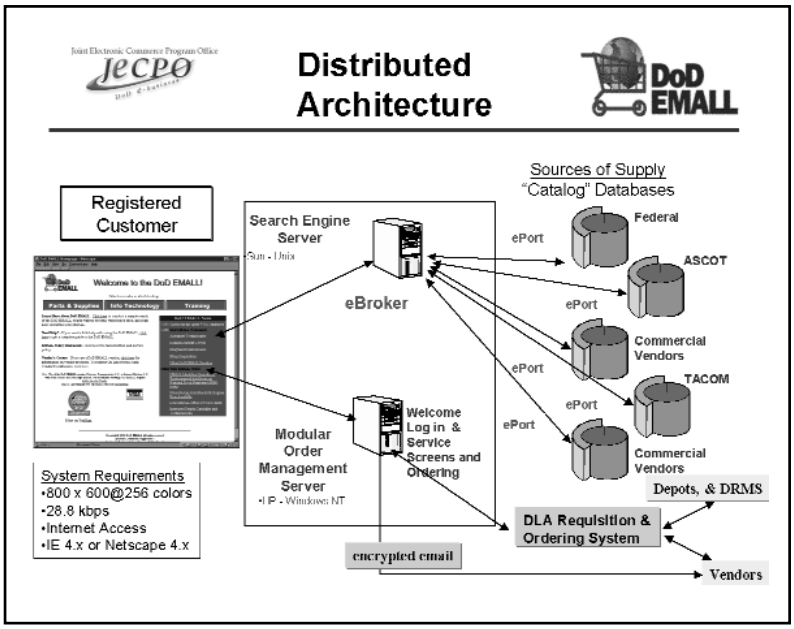
Using EMALL for purchasing is not mandatory for DoD personnel, and some resistance to using the system has been reported. Currently, a proposed policy is being considered by the CIO of the Defense Department to require all users to go first to the EMALL before going elsewhere for purchases. If supported, this would provide more top-down leadership in support of the EMALL.

In an effort to provide a user-friendly site, EMALL provides an on-site demonstration of the site, a briefing with an overview of the project, a prominent help feature complete with a very effective glossary of terms, lists of related sites, and flowcharts describing the purchasing processes involved. The site also prominently features information about "green" products and safety information about products.

Lessons from the EMALL experience include:

- **The importance of strong leadership from the top and supportive policy direction in setting the policy and direction of the e-commerce applications, and in overcoming resistance.** Clearly, the impetus for these efforts has been federal leadership from the White House and from the Office of the Secretary of Defense. The fact that these activities have been couched as part of the secretary's procurement and administrative reform efforts is different from the goals in other jurisdictions but has had a motivating effect in the Department of Defense.
- **The importance of having a centralized data architecture and one central site for purchasing efforts.** For such a large organization, striving for one centralized data architecture is essential.

Figure 2: Distributed Hardware and Software Architecture, U.S. Department of Defense DoD EMALL



Source: Joint Electronic Commerce Program Office. 2000. Standard EMALL Briefing (PowerPoint format). Available at www.emallmom01.dla.mil/scripts/info/learn.asp, August, 2000.

[32] *Joint Electronic Commerce Program Office. 2000. Standard EMALL Briefing (PowerPoint format). Available at www.emallmom01.dla.mil/scripts/info/ learn.asp, August 2000.*

[33] *Zimmerman Interview, 2000.*

The Future

New Trends

As fast as these developments are moving, there are more on the horizon that will impact e-government and e-commerce applications in the public sector.

Since the Y2K issue was resolved, there were many private sector firms looking for new tasks and missions at the beginning of 2000. Many of these firms moved on to the public sector and the newly emerging e-government efforts. These private sector enterprises, sometimes referred to as "gov.com" companies, are rapidly tailoring their services to governmental jurisdictions without the technological capabilities or resources to develop online services and e-commerce applications on their own — or which simply decide to outsource these efforts. These firms are recognizing that government efforts are now growing as fast as those in the private sector and that prospects for future growth are great as many more new companies move to capitalize on these initiatives. These firms include Govt.com, EZGov.com, FileAmerica.com, GovWorks.com, Link2Gov.com, National Information Consortium (www.nicusa.com), Publicsectorzone.com, GovConnect.com, and SimpleGov.com. Some other firms have already moved on or have gone out of business.

Since the E-Sign legislation passed at the federal level to provide uniform policy direction, many new e-commerce initiatives can now move ahead. Already, states and the federal government have announced new initiatives. For instance, the federal government has created the FirstGov.gov portal site and California has announced a $10 million e-government initiative to add $2.45 million for government-to-business systems and $1.2 million for government-to-citizen systems.

Seven states have initiated the concept of premium services for their citizens as a way to help pay for their e-government and e-commerce activities. Under these programs, a citizen or business pays a fee and registers online. In most states, this fee then enables the user to have access to otherwise restricted databases (corporation or driver's license records, for instance). In some states (Georgia, for instance), this simply allows a user to be billed for online services rather than pay by credit card. This trend, an e-commerce application itself, appears to be growing.

Another new feature developed and used by at least three states is a service portal like the private sector's My Netscape (my.netscape.com) or My CNN (myCNN.com). These sites may be personalized with real-time information on stock prices, news headlines, weather from selected cities, or even horoscopes. Once personalized, the user may call up their own page at any time through their web browser and access their selected information. In the government context, MyVirginia (www.vipnet.org/vipnet/myvahomepage/cgi-bin/myvahomepage.cgi) allows users to personalize their site with selected headlines from state newspapers, news from the legislature or courts, weather, job notices, and e-mail notification of new features when they are added. Virginia's e-commerce applications can be easily highlighted on a user's page. As part of its

premium services, users in Kansas can also personalize their accessKansas page with weather, services, and linkages.

Challenges and Concerns

While the advances are exciting and interesting, many challenges and concerns about public sector e-government and e-commerce remain. Probably the most important of these is the digital divide between those who can afford the technology and expertise required to take advantage of the e-commerce applications on their desktop computers and those who cannot. A divide already exists between those who frequently use government services and those who do not know whom to contact or how to make their way through the system. Using computer- and Internet-based service delivery and e-commerce activities could accentuate that divide.

The digital divide in Internet usage is declining in some ways and remaining stable in others. Overall, 41 percent of all households (an increase of 51 percent in 20 months) and 44.4 percent of all individuals had access by August 2000. The disparities between the genders has all but disappeared (44.6 percent of men and 44.2 percent of women use the Internet) and the rural/urban gap has also declined (38.9 percent of those in rural areas have access). The divide declined the most among older Americans, who experienced a 53 percent growth in usage compared to 35 percent overall.[34]

However, the divide still exists for African-American and Hispanic households, although it is declining. While the percentage of African-American households using the Internet has increased 109 percent in 20 months, only 23.5 percent are using the Internet. The percentage of Hispanic households using the Internet has also increased (87.3 percent since April 1998), so that now 23.6 percent of these households access the Internet. These levels are still disturbingly lower than those of white households.[35] The most serious digital divide exists among individuals with disabilities. Only 21.6 percent of individuals with disabilities use the Internet as opposed to 42.1 percent without disabilities.

To avoid exacerbating the distance between government and its citizens, public sector agencies must use extreme care in incorporating new technologies and moving service delivery online. New strategies must be developed to ensure that access to technology and expertise does not keep citizens from these new service delivery opportunities.

It is also important to be absolutely clear that e-commerce transactions within the e-government context does not replace face-to-face traditional government. If anything, it ensures that routine transactions can be handled more quickly and staff have more time to devote to face-to-face interactions.

Other crucial concerns for the public sector include the absolute necessity to maintain citizens' privacy, confidentiality, and the security of their transactions. While these are always important in any e-commerce application, they are even more important for public sector agencies since they are operating with the public's trust.

It is also important that governments begin to track the effectiveness of these efforts. The development of effective performance measures has begun,[36] but work focusing on e-commerce applications still needs to be done.

There are also many technical and logistical issues to be resolved. As a matter of course, government agencies are geographically constrained, so they can reach only a finite number of citizen-users — unlike private sector e-commerce activities, which can hope to reach a global market. Therefore, many agencies may not have the resources to develop advanced e-commerce applications; this is yet another reason to proceed with public-private partnerships in order to develop these applications.

Finally, public sector sites are by nature limited in what e-commerce applications they can offer since they provide public goods and quasi-public goods. So, government e-commerce applications are mainly limited to those related to procurement, sales of particular licenses and certificates, and tax filings.

[34] *U.S. Department of Commerce Economics and Statistics Administration. 2000. Falling Through the Net: Toward Digital Inclusion — A Report on Americans' Access to Technology Tools. Available at www.ntia.doc.gov/ntiahome/fttn00/falling.htm*

[35] *Ibid.*

[36] *McClure, Charles R., Sprehe, J. Timothy, and Eschenfelder, Kristen. 2000. Performance Measures for Federal Agency Websites: Final Report. U.S. Defense Technical Information Center, Energy Information Administration, and Government Printing Office. Available at fedbbs.access.gpo.gov/libs/measures.htm*

Recommendations and Directions for the Future

There is enormous potential in e-commerce applications for the future — potential to bring routine transactions right to the desktop on a 24/7 basis for citizens. There are many important considerations in using e-commerce effectively in the public sector. Gathering together the many lessons learned from both the private and the public sectors, we reiterate the most important below.

Planning

Among the most important tasks to undertake is strategic planning for a jurisdiction's website, and e-government and e-commerce activities.

- **Agencies must have a strategic vision for the project and should ask appropriate strategic questions before beginning the project.** Having a strategic vision for e-government and e-commerce activities helps to ensure that they are not determined by consultant and vendor appeals and that all activities support the ultimate mission of the agency or jurisdiction. Regarding the strategic vision, the agency should include input from citizens and others so that the all-important end-user perspective is part of the planning of the site from the outset.

Implementation

There are many implementation strategies that can improve a public sector agency's e-commerce strategies.

- **Citizen service is the most important consideration; plan for user-friendly services with the user in mind and as a participant in the planning process.** A site that cannot be easily used by the least sophisticated user, one through which the user must stumble in order to find online services, is not an effective site for any government agency. Sites must be designed with the user, not the organizational structure, in mind. Citizens think of and find services not by agency name but by type of service. The most effective government sites, the easiest for citizens to use, include direct links to available online services, help facilities, and frequently asked questions (FAQs).
- **Support and strategic vision from top leadership in the agency or jurisdiction is key.** It is a truism that information technology projects need support from the top to succeed, and e-government and e-commerce activities are no exception. All of the case studies — San Carlos, Washington State, Massachusetts, and the Defense Department — were successful project implementations and all had support from their chief executives and, in some cases, active support from the lieutenant governor or other top leadership.
- **Agencies should develop appropriate experience with basic e-government activities before moving on to more complex e-commerce operations.** The San Carlos and Washington

cases in particular indicate that experience with the more basic e-government activities is important before undertaking more complex e-commerce activities.

- **Projects must be marketed; "build it and they will come" will not work.** The San Carlos and Department of Defense experiences are very instructive in pointing out that just building an excellent site is not enough. Citizens will not know to come unless they know about the site — sponsors must market the site in order to get users. In San Carlos, city officials made presentations before community groups and advertised in other ways. To encourage use, Defense Department officials are attempting to require users to go to the EMALL before going to other online sites.
- **Reach across the digital divide and provide affirmative outreach to citizens who might not have the necessary expertise or access to equipment.** The public sector needs to be sure that, in moving ahead with these important innovations, they do not leave behind the very citizens for whom contacting government is already a challenge. Make sure that libraries and other points of computer and Internet access have not just the equipment but handouts that clearly explain how to access your agency's website, its e-government activities, and its e-commerce applications. Explain how they can help to make interactions with government easier and more convenient. Set up and host introductory sessions in government offices, the library, and schools, showing citizens how to use the computer, the government's website, and its online applications. Provide job listings on the website to encourage citizens to cross the digital divide and view your own agencies' offerings. These are just a few strategies to help ensure that a sizable group of citizens is not left behind as e-government moves ahead.
- **Provide content and value-added services to citizens to help build a community around the site.** Private sector sites use value-added services (like book reviews and e-mailing reminder notices) to build ties between the site and the user. The public sector can do the same thing. Governments could e-mail users who subscribe about RFPs in their area of interest, new regulations or actions that interest them, or news of community and sporting events.
- **Use familiar models of operation to help citizens use the system.** Like the private sector, public sector sites need to use familiar models of operation to make sites easy to use. Many e-commerce sites use the familiar shopping cart model, which consumers find easy to use. Public sector sites, like Washington State's Central Stores Online, use the same model with some success.
- **Take advantage of the lessons learned elsewhere.** There is no need to reinvent the wheel — look at and learn from what others have done. Examine the websites discussed in this report; see for yourself what seems to work and what does not (see bss.sfsu.edu/~mpa/faculty/facultyprojects/ecommerceproject.htm for online linkages to the sites in this report). Also look at the resources available on that page and follow them to see the issues and the pros and cons of various strategies. This field changes incredibly quickly, and the best way to find out the challenges and issues is to follow online magazines, reports, and listservs. From these, take advantage of the experiences of others to ensure the success of your own efforts.

Resources

Resources are, of course, important to achieve any goal that uses information technology today. Issues regarding resources include the following:

- **Adequate monetary and staffing resources are crucial.** Adequate funding and staffing resources are of course crucial to the successful implementation of any e-government or e-commerce site. Massachusetts' case, with their two IT bond issues, provides evidence of how many resources could be used. But even Massachusetts ultimately partnered with other states to create the ambitious multi-state Emall project. The community of San Carlos also provides an excellent example of what can be done with a culture of innovation and creative partnerships that serve to "create" new resources.

Rules for E-Commerce in the Public Sector

Rule 1: The goal of new government e-commerece efforts should be to enhance effective services to its citizens, enhance productivity, and enhance accountability.

Rule 2: The ability to streamline the structure, influence, and control of the flow of information is dramatically more powerful and cost-effective than many other government processes.

Rule 3: Inability to overthrow outdated ways of conducting government business can lead to ineffective and inefficient government service delivery. Use new technologies to rethink services.

Rule 4: Government cannot afford technology to be an afterthought in forming service delivery strategy; it must be totally integrated as an important tool.

Rule 5: Use technology to innovate, entertain, and enhance the service delivery process.

Rule 6: E-government and e-commerce applications are just a few ways of enabling governments to listen to their citizens and providing either the most effective or the best services.

Rule 7: The tough task for management is to align strategies, processes, and applications fast, right, and all at once. Strong leadership is imperative for the e-government and e-commerce applications to work.

(Based loosely on Kalakota and Robinson, 1999)

- **To stretch resources, reach out to other agencies and develop partnerships.** Consider partnering with other agencies to stretch the resources of your own agency. There are several types of partnerships available — with other jurisdictions (like Massachusetts with its multi-state Emall), with umbrella groups whose role is to bring jurisdictions together (like San Carlos and its collaboration with ABAG), and with other agencies within the same jurisdiction (like the Department of Defense and Washington State in pooling the purchasing power of all their agencies).
- **Adequate staffing is essential.** Ensuring adequate staffing in the IT function in today's government agencies is a difficult task. With the private sector paying large signing bonuses, salaries, and sometimes even retention bonuses, it is difficult for the public sector to compete. In addition, the private sector has the advantage of being able to hire quickly and thus can hire IT staff as soon as they become available. Hiring consultants is one solution, but this, too, comes with its own challenges. With the Y2K work completed, many companies rapidly switched their mission and marketing strategy to e-government and e-commerce in the public sector; not all companies have made that transition successfully. It is important to be sure that the companies with which your agency works have the needed experience and expertise to help you effectively.
- **Training is also essential.** Once IT staff have been hired, it is also essential that adequate training in this fast-moving field be made available to them. Not only is it crucial to keep up with technology in order to successfully implement e-commerce solutions, but providing training is one way of providing job satisfaction to employees and enhancing employee retention.

Conclusions

There is an exciting future ahead in e-government and e-commerce, fueled by technology and our imagination. Government processes can be improved and e-commerce can assist in that process. E-government and e-commerce will not replace face-to-face government, but they can definitely enhance it. There are many challenges ahead for e-government and the e-commerce applications that will enable those efforts. A careful analysis of potential applications, viewed within an agency's own mission and goals, and an examination of other agencies' experiences and lessons learned will help to ensure success.

Appendix

Current State E-Commerce Applications*

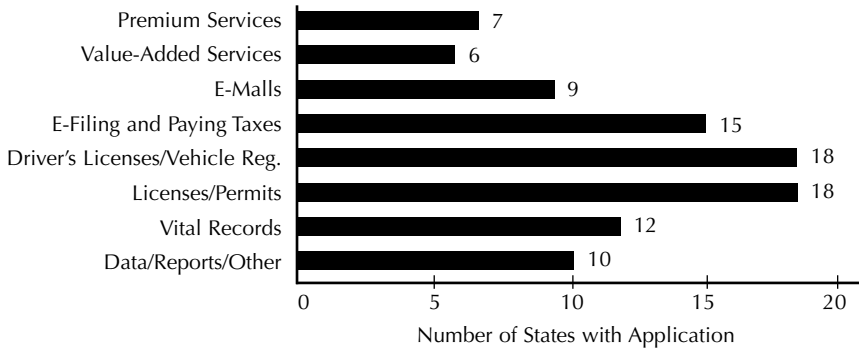
State	Sale of Data, Reports/ Other	Sale of Birth & Death Certs.	Sale of Licenses or Permits	Driver's Licenses	E-Filing Tax Returns	Aggregated Vendors — Mall	Value-Added Services	Premium Services
Alabama					X			
Alaska			X	X				
Arizona				X				
Arkansas	X		X	X				X
California				X	X			
Colorado		X	X		X			
Connecticut								
Delaware			X					
Florida	X			X			X	
Georgia	X	X	X					X
Hawaii			X					
Idaho						X		
Illinois			X		X			
Indiana	X			X	X			X
Iowa			X		X			
Kansas	X		X		X		X	X
Kentucky	X	X	X			X		
Louisiana				X				
Maine	X		X		X		X	X
Maryland				X				
Massachusetts		X		X		X		
Michigan		X						
Minnesota								
Mississippi		X						
Missouri								
Montana								
Nebraska		X	X		X			
Nevada				X				
New Hampshire								

continued on next page

** States whose names are bolded are those with home page icons or menu options leading the users directly to their online services.*

State	Sale of Data, Reports/ Other	Sale of Birth & Death Certs.	Sale of Licenses or Permits	Driver's Licenses	E-Filing Tax Returns	Aggregated Vendors — Mall	Value-Added Services	Premium Services
New Jersey		X		X				
New Mexico				X			X	
New York				X		X		
North Carolina	X			X				
North Dakota		X	X					
Ohio	X	X			X	X		X
Oklahoma					X			
Oregon								
Pennsylvania								
Rhode Island								
South Carolina								
South Dakota	X	X	X		X	X		
Tennessee				X				
Texas			X	X	X	X		
Utah			X	X		X		
Vermont								
Virginia				X	X		X	
Washington		X	X		X	X	X	
West Virginia								
Wisconsin			X					X
Wyoming								

E-Commerce Applications in the States



Most e-commerce applications in the public sector are found among the states. This figure provides information on the number of states that are providing the most prominent of the currently available applications.

As can be seen, the most commonly seen application is the sale of licenses or permits (typically hunting, fishing, and driver's licenses) and vehicle registration renewals. Following these are e-filing taxes with actual payments being exchanged online. Next are the sales of vital records (sale of birth and death certificates), which are made possible online in many states with the use of VitalChek, a vendor application that allows the exchange of payments. Some states (10) use e-commerce to sell data, prison industry goods, or their own states' products online.

About the Author

Dr. Genie N. L. Stowers is a Professor and Director of Public Administration at San Francisco State University and Associate Dean of the College of Behavioral and Social Sciences. At San Francisco State University, she teaches courses on financial management, program evaluation, and managing information in the nonprofit and public sector.

Dr. Stowers has worked in the area of government Internet applications and online teaching since 1995. Her research interests include information management and electronic government information, policies and management of human service and nonprofit organizations, urban policy and politics, and policies and politics affecting women and ethnic/racial minorities. She has published articles in *Government Finance Review, Public Administration Review,* and *Journal of Public Affairs Education*. Dr. Stowers is currently writing a book about innovation in e-government as well as a study of the information architecture of public sector websites.

Dr. Stowers has also been a visiting scholar at the Institute for Governmental Studies at the University of California, Berkley. She was also a professor in the Department of Political Science and Public Affairs at the University of Alabama at Birmingham, where she directed the Women's Studies Program.

Dr. Stowers received her undergraduate degree from the University of Florida and her Ph.D. from Florida State University.

Key Contact Information

To contact the author:

Genie N. L. Stowers
Professor and Director of Public Administration
San Francisco State University
1600 Holloway Avenue
San Francisco, CA 94132
(415) 338-3615

gstowers@sfsu.edu

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For additional information, contact:

Mark A. Abramson
Executive Director
The PricewaterhouseCoopers Endowment for
The Business of Government
1616 North Fort Myer Drive
Arlington, VA 22209

(703) 741-1077
fax: (703) 741-1076
e-mail: endowment@us.pwcglobal.com
website: endowment.pwcglobal.com

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1616 North Fort Myer Drive
Arlington, VA 22209-3195