

ANALYSIS OF THE USE OF THE WORLDWIDE WEB AND INTERNET IN GOVERNMENT SERVICE DELIVERY

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for the business of government

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1. INTRODUCTION

1.1. Background

A wide variety of governments have begun to use the worldwide Web to assist in service delivery. This includes, but goes far beyond the dissemination of information to the general public and includes a variety of other governmental functions. Examples include:

- Obtaining passport applications and other federal tax forms.
- Contesting or paying traffic fines.
- Ordering government publications.

- Filing requests for zoning variances.
- Reserving space for athletic events or tee times for public golf courses.

In reviewing some federal, state and local government Websites it is clear that the use of the Web for service delivery is still in its infancy. Nearly any function that now requires a person to stand in a line and submit a paper form could be delivered to the Web. The issue of verification of identity is undoubtedly subject to technological innovation. Personal Identification Numbers, scanned fingerprints and other techniques will soon make it possible for licensing and minor police and

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adjudication processes to be delivered through the Web.

The type of services that can be delivered through the Web are still in the process of being imagined and organized by both governments and the private sector. Over the next decade we can expect to see a great deal of experimentation and organizational learning in this area. The purpose of this report is to accelerate this learning process by studying several noteworthy current government efforts to use the Web for interactive functions.

1.2. The study

The methodology of this study is to select a number of illustrative case studies on the use of e-commerce and the Internet in government service delivery and communications. The

Study includes a content analysis of selected state, local and federal government web sites and where available, an analysis of the cost and benefits of switching to web-based service delivery.

The analysis describes and compares the ways in which different governments plan to use the Web in improving level of customer satisfaction as well as the effectiveness and efficiency of the services they deliver. The specific research questions we would address include:

- What content does government in the United States now provide on the Web?
- What transactions with government

can customers use the Web to complete?

- What government services are provided through the Web?
- How are these services funded? What are the costs and benefits of service delivery through the Web?
- What new information and services do they plan to deliver through the Web over the next 1-2 years? Over the next 3-5 years?
- Do governments plan to increase the use-mail to communicate and interact with citizens? If so in what ways?

We have selected cases in Alaska, the U.S. Internal Revenue Service, the city of Boston, the States of Florida, Indiana, Texas and Utah. In Section II we discuss the lessons learned from the cases and their broader implications for government service delivery. In section III of the report, we provide background on the Websites we reviewed, discuss the development and implementation of the site and analyze its costs and benefits.

2. Lessons learned from the cases: implications for government service delivery

In researching these cases we discovered that most governments in the United States were beginning to utilize the Web for both service delivery and information dissemination. We did not have the resources in this study to conduct a systematic survey of government Web si-

tes and believe that a systematic sample survey should be conducted. Nevertheless, to produce the seven case studies reported in this study we contacted well over fifty government organizations that had Web sites we considered well developed and that provided citizens with a direct service. We found that less than 15% of the government organizations we contacted to conduct this study had collected data on the costs and benefits of using the Web as a means of delivering services. Very few of the organizations we contacted had analyzed the costs and benefits of using the Web before launching their sites.

Most of these organizations had obtained funding for their sites by convincing senior management that the Web was the “wave of the future” and Web-site development was a defensive reaction to the need to appear to be on the cutting edge of this new trend. Funding was more a function of fashion than a result of an analysis of cost savings or expected benefits. Most officials assumed that the use of the web would increase customer satisfaction and was self-justifying.

When costs were assessed in the cases presented in this report, we found that typically services delivered over the Internet were less expensive to deliver than those delivered in-person. In one instance we found that it cost less to process mail-in forms than either Web-based or in-person form processing. The unit costs of electronic service provision benefited from economies of scale, due to the large cost of setting

up infrastructure and the relatively low cost of operation and maintenance. We found that as an agency’s customers got more comfortable with Web-based service delivery and used it more frequently, unit costs dropped dramatically.

We also found that electronic service delivery could change human resource deployment patterns and improved organizational performance. It freed up staff to provide better service to in-person customers, and allowed workers to focus less on routine tasks that could be easily handled by computers.

The business potential of electronic service provision was highlighted by the Indiana case. Since service recipients would pay for the ease of use, and lower costs of obtaining service through the web, a revenue source was found to fund the capital, operation and maintenance costs of a Web site. Many government licenses, permits and services require user fees. An additional fee can be charged for the convenience and potential time/labor savings of on-line processing.

A second source of revenue for electronic service provision is savings generated from reduced costs. There are several problems with this source of “revenue”. First, it may take several years to materialize. E-services require an investment in computers, communication infrastructure, software, and Web design and expert staff. Once the service is up and running it will take time before customers are aware of the service and feel capa-

ble and comfortable enough to use it. The benefits of reduced service costs will tend to occur in a different fiscal year than the year that costs are incurred.

If our impressions are correct, most advocates of web-based service delivery do not collect or use data on unit costs when planning these service enhancements. Moreover, it is not clear that data is collected or projections are made on benefits either. The absence of business planning will almost certainly lead to mistakes in developing these services. When sites do not produce immediate benefits, or other operational problems develop, sites that may have great potential may be abandoned prematurely.

The seven cases we analyzed demonstrate the potential for lower costs and improved services through the use of the Web. In several of the cases we see government moving into new areas with care and thoughtful planning. Among the cases we reviewed but did not write-up were numerous examples of Web-based services developed without a business plan and without a projection of costs and benefits. We conclude therefore, that government must obtain additional management assistance before launching these new enterprises. Consulting firms and experts with experience in launching these new ventures should be hired by agencies that are planning to deliver service using the Web. An effort should be made to assess costs and benefits and use that analysis to shape the form of the site, the services of-

ferred, the fee structure and the phasing.

Some analysts of government operations have considered the Web as a potentially revolutionary force in service delivery. The impression we gain from this study is that the impact of the web on government service delivery will be slow and incremental. It will likely result in gradual, small scale service enhancements. Customers will be provided with alternative modes of access to government and will notice some improvement in service delivery. In some instances the cost of service delivery will be reduced. When mistakes are made, or when redundant points of access are provided to please customers, the costs of service delivery will rise.

3. THE CASE STUDIES

3.1. The case of Alaska

www.state.ak.us/

Site accommodates two Department of Motor Vehicle (DMV) transactions: renewal of motor vehicle registrations and ordering personalized license plates.

Worthwhile project due to increased customer satisfaction. As core services are streamlined through web-based service delivery, employees benefit from increased opportunity to meet more challenging responsibilities.

Background

Motivated by negative newspaper articles, long lines and dissatisfied customers, Gov-

ernor Tony Knowles of Alaska issued an executive order, in January of 1997 to re-engineer the Department of Motor Vehicles (DMV). The first stage of creating a more efficient and effective DMV was to move it from under the Department of Public Safety, whose first concern was police functions, to the Department of Administration, where it would receive more attention. Once under the Department of Administration, DMV underwent a critical analysis of its core functions in order to develop a new approach to service delivery. Two transactions were identified as targets for Internet delivery: (1.) Renewal of motor vehicle registrations and, (2.) Ordering personalized license plates. These were simple services that were performed daily and were selected for pilot project experiments.

Previously, DMV conducted these two transactions through the mail or through in-person counter transactions in the DMV offices. Registration renewals through the mail could take anywhere from several days to 3 weeks. Similarly, ordering personalized license plates through the mail took from 4-6 weeks to check name availability and order the plates. While counter transactions were significantly quicker for both services, they still could take anywhere from 15 minutes to 1 and 1/2 hours for registration renewals and several weeks to check name availability and order personalized plates.

Currently, DMV e-services have decreased the time spent per transaction.

Registration renewals take approximately 100 seconds over the Internet and personalized license plate transactions take about 30 seconds. Not only did the introduction of e-services for these two transactions decrease the amount of time per transaction, but they also enabled counter employees to deal with more complex transactions, such as the issuance of driver's licenses.

The Emission Inspection (I/M) station registration process also uses the Internet to facilitate transactions, is a public-private partnership between DMV and private I/M stations in Anchorage and Juneau, enables the private partners to renew vehicle registrations while the vehicle receives a mandatory emissions test. The private stations access the DMV database through the Internet at the end of each day to update the registration system and to transfer the funds they collect throughout the day. This brief, daily interaction enables the stations to conduct the transactions without DMV assistance or interference. The stations use their own credit card machines, contracts, and labor. Some I/M stations charge for the registration service, while others view the increased number of customers who use the service and may buy other products as adequate compensation.

Finally, the DMV Website also includes video footage of the office sites and the customer lines. The video frames change every 5 minutes between 8:30 am and 4:30 p.m. They enable the consumer

to identify ideal times to go to the DMV office for counter transactions.

Development

Before conducting registration renewals or ordering personalized plates online, DMV had to create the infrastructure to support these transactions. DMV hired SAGA Software, a consulting firm based in Reston, Virginia, to create the systems program. For this initial stage, the consultants were paid a one-time fee of \$50,000. In-house employees from both DMV and the Information Technology Group (ITG), another governmental agency also housed under the Department of Administration, wrote the web scripting. It was estimated that an additional \$250,000 was spent on employees and equipment, making the total set up costs \$300,000.

ITG employees are responsible for maintaining the site, which costs approximately \$440 per month (3 hours per week of analyst programmers time at \$100 and \$40 per month of regular employees time) and DMV employees are responsible for transactions and responding to customers.

Implementation

Registration renewals and search and order of personalized plates were available as online transactions by the end of 1997. In 1998, 4,828 customers used the Internet to reregister their vehicles, a number that rose to 10,115 in 1999. While this

was only 4.7% of the DMV registration renewals for that year, the alleviation of those 10,000 transactions influenced the entire registration process. By diverting a portion of the overall transactions, in-person and mail-in services were provided more quickly.

More significantly, in 1999, private I/M stations renewed 24.2% of the vehicle registrations for that year. In 2000, I/M stations have already completed 25.7% of the total registration renewals. This partnership has diverted and consolidated a significant proportion of DMV transactions into single daily transfers from each partner.

Prior to the new registration options, DMV received negative press about their inefficiency and long lines. While the DMV did not formally measure customer satisfaction with the Internet transactions, they have noticed significant improvement, indicated by increased utilization of e-services and an increased number of unsolicited customer compliments. Mary Marshburn, Director of the Department of Motor Vehicles, has found that each year more customers are using the Internet to renew their vehicle registrations.

In addition, most customers emails are no longer negative, they tend to thank DMV, “for the most pleasant vehicle registration process of my life” and for “an outstanding, informative and useful website.” Since Internet transactions were begun, the DMV is a very different place; lines are shorter, customers are happier,

and staff are more accessible because they do not have to spend as much time responding to complaints.

allows customers to perform transactions in a variety of different venues, which increases access to DMV. Similarly, employ-

Exhibit 1: Automobile Registration Renewals in Alaska²

Year	# of Online Registration Renewals	% of Total DMV Registration Renewals
1998	4,828	2.06%
1999	10,115	4.73%
2000 (Jan. to April)	4,691	7.195%

In addition to these improvements, the Internet services also cost less than the in-person transactions. An Internet registration renewal costs \$3.62 per transaction, while a counter registration renewal costs \$7.74 per transaction. Mail-in registration is still the most cost effective at \$3.35; however, this method has the longest turn around time. Furthermore, as more individuals use e-services, they will become more cost effective because the primary incremental expense is the credit card cost that decreases when a higher volume of transactions are completed.

Analysis

This project was worth doing because customers are more satisfied because services are quicker and more convenient as a result of the new e-services. The Internet

ees are more satisfied because they are no longer spending as much time dealing with dissatisfied customers and service complaints. As core services are streamlined, the employee's role is slowly shifting away from direct customer service toward more challenging roles as trainers and auditors for the I/M station registration renewal program. As a result of this redistribution of tasks, DMV reclassified their positions and all employees received a two-grade increase.

In addition to customer and employee satisfaction, this initial program puts in place the infrastructure to expand services. The Alaska DMV plans to increase services to include renewal of drivers licenses and address changes online. By increasing services provided over the Internet, the entire program becomes more cost effective. Furthermore, as ser-

2. Data appeared in an unpublished memorandum sent from Mary Marshburn, Director of Department of Motor Vehicles in Alaska, on June 14, 2000.

Exhibit 2: Cost of automobile registration Renewals in Alaska³

Type of Transaction	Direct Labor*	Direct Materials**	Overhead***	Development Cost	Credit Card Cost	Total Unit Cost
Counter	4.15	.11	3.48	-	-	7.74
Mail-in	1.56	.48	1.31	-	-	3.35
e-service	.52	.53	.40	.85	1.32	3.62

vices are new, there is still room for improvement. Currently, about 95% of a transaction is completed through the Internet, with only 5% of the process completed manually. The manual labor is needed when an error occurs in the system and someone must investigate and correct the inaccurate data. In addition, someone must manually change disks and enter forms. While DMV has automated most of the process, their goal is to have transactions that are 100% automated. This would result in even more efficient transactions.

Alaska's long term goal is to develop a portal system that can accommodate all

state government Internet transactions at a single point of contact. Currently, each department is responsible for the development and maintenance of their specific transactions, which has resulted in a significant amount of duplication and competition between varying state agencies. This case raises the issue of coordination of the technical infrastructure needed to support internet-delivered services. It also indicates that electronic service delivery effects both customers and administrative operations. In this case, the Internet reduced demands on administrative staff and allowed them to provide better service to customers who did not use the Internet.

3. Figures on e-service transactions, appear in an unpublished memorandum written by Mary Marshburn, Director of the Department of Motor Vehicles in Alaska, on 6/14/2000. Figures on Counter and Mail-in transactions appeared in a memorandum written by Tom Cherian, Finance Officer for the Department of Administration in Alaska, on 10/13/97.

*Direct labor costs are assumed to consist of 80% of total personal service expenditures for the DMV Field Service component. Direct labor costs are allocated to each major class of transaction based on the amount of time required to process the transaction type and the total number of transactions processed during the year.

**Direct materials include the cost of postage, license plates, license tabs, photo costs, and forms. Direct materials costs data were obtained from DMV Deputy Director Chuck Hosack.

***Overhead is determined using the same methodology that was used to allocate direct labor. That is, overhead is allocated to transaction classes based on processing time and number of transactions. The components consist of building lease costs, equipment amortization costs, and three support staff from the Driver Services component.

3.2. The case of Boston

www.ci.boston.ma.us

Boston site offers good content, serves as an engaging information resource, and provides an impressive list of online services like paying parking ticket fines, registering to vote, obtaining dog license and more.

Successful project of interest to casual information seekers and those seeking access to Boston city government services. Conveniently and efficiently facilitates a variety of services for citizens. Excellent example of well-funded and well-designed e-government.

Background

Boston's overall city web site has a clear mission of delivering good content to citizens, it is an excellent example of how e-government can work if well funded and designed. Beyond the typical features for obtaining forms and reviewing restaurant inspection reports, Boston offers a great deal of serious information as well as interesting background on the city, and many onerous city-related tasks can be taken care of here as well.

Set up clearly and logically, the first area of the site directs different categories of users to different parts of the site based on whether they are residents, business people or visitors. Each type of user can then access a wide range of useful information pertinent to their needs. Visitors, for example, can find out historical information on the city, popular tourist sites'

locations and hours, and even find great locations for film shoots if they are visiting from Hollywood.

Residents have several areas in the site. Most popular is the "Mayor's Food Court," containing the recent inspection reports for all restaurants in Boston, with explanations of violations and total scores. There are also pages where residents can manage obligations to the city; the section for excise tax payment, for example, has been successful. On this page, you can pay your motor vehicle excise tax with a credit card, a tax that previously had to be paid in person or by mail. Similarly, citizens can pay their parking tickets on line, using a credit card, and file for dismissal as well. Even more information can be accessed. Missing a dog license? Looking to register to vote? There are few city services not available online here.

Businesses also have a thorough selection of available services. As in the residential section, users can both access forms and conduct transactions. For the former, over 20 different forms are available, the vast majority of the paperwork needed to conduct business in the city. Transactions online are similarly comprehensive, allowing businesses to search for available real estate or bid on city contracts via an online RFP process.

Development

One of the most interesting aspects of the Boston site is that its development is com-

pletely in-house. Boston recognized the need for a Website as vital, and created a partnership with Hitachi who has become its single private provider, and provides all hardware (Web servers, e.g.), in exchange for prominent mention on the Boston site. The equipment is very cutting edge, able to facilitate over 1 million hits a day; the value of the donation exceeded \$200,000.

The development costs also included the two full-time in-house staff, which today has grown to a full-time staff of six. Additionally, they purchase some software upgrades. Boston uses the latest Web technology, using ASP programming language for example).

The Boston site, however, is determined to not be driven by costs, and to keep tight control over the content, development and maintenance. According to the manager of the site, this is how the site has become so successful, winning many awards.

Implementation

By all accounts, Boston's is a successful site. According to the site's managers, many features have shown significant increases in use since the site was launched. Motor vehicle excise tax payment, for example, increased by 300% from mid 1999 to mid 2000. In the year 2000, an average of three thousand tickets were paid over the internet each month. Although no specific data were provided to us, people managing the site believe that the site saves government money. With the motor vehicle excise tax,

for example, the city formerly saw many payments at city hall, and as a result, had a huge backlog of paperwork. It is estimated that about 6000 payments were made online during the first year of service, with about \$500,000 of payments made. The time administrative staff has had to spend on filings related to the tax has decreased substantially since the payment option has gone online. Such a decrease certainly opens the opportunity for more efficient staff allocations.

Analysis

The success of Boston's site is evident even to the first time user. Compared to a site's such as New York's, for example, Boston's is aesthetically more pleasing, easier to navigate, and provides more options. The site can have an effect on the public's perception of government, as citizens come to see that the government has become easier to work with.

3.3. THE CASE OF FLORIDA

www.fhs.net

Florida High School site seeks to build on and expand the traditional idea of the online school and can serve any student in the state.

Ambitious attempt to use Internet technology for high school education that achieves outstanding success in its graduation rates and other measures. Pushes the envelope on e-government.

Background

To equalize access to education for all Florida residents, The Florida Department of Education initiated a transition from the traditional learning environment to The Florida High School (FHS) online environment. The Florida High School's goal is to build a quality education system that eliminates the shortcomings of the traditional educational delivery system. This site can in fact serve any student in the state, from rural students who need more course selection, to working students who need hours that are more flexible. The FHS has had a major impact on Florida education, with teachers from all over the state providing curricula for the school. Student participation has grown, perhaps drawn by the freedom implicit in the motto, "any time, any place, any path, any pace."

The program seeks to build on and expand greatly the traditional idea of the online school. One example of such a school was the Orange County Public School's 1996 experimental online program, the "WebSchool." This school offered SAT Preparation and Computer Programming to Orange County students. These specialized programs have been available for some time; in disk form before online, but did not have broad enough offerings to replace actual high school course work.

While Orange County piloted its "WebSchool, Alachua County proposed a statewide online high school. This was

a more ambitious idea, with the goal of delivering actual high school course material to students on line. The Department of Education identified the two sites as having similar goals, and suggested collaboration, offering a seed grant as a catalyst. The counties met and decided to collaborate, and created the Florida High School, originally offering five online courses. According to the web site, the project's mission "is to place a complete high school online by the year 2001 and will include those student services that will enable students to successfully transition to postsecondary educational institutions and to the workplace." To ensure high quality of course content, the program will aim to meet the Florida Sunshine State Standards and other more stringent criteria supported by the education and business communities. It will also use the Internet to deliver facilitated instruction to students, an innovative use of the Web.

The program has both a brick-and-mortar location and Website. The site is organized around the coursework and curriculum, the integral part of the program. Each course has its own section of the site, accessed from the main course area. The online syllabus shows the assignments and required reading for the course. The high school has aimed to have as much of the required activity available on the site as possible; links take students to other sites for articles, and textbooks are offered on CD-ROM. There are also additional links for students with a particular interest in

topics covered, making it easy for students to explore topics in as much depth as they like. The school appeals to and creates self-motivated students with a drive to learn. It also helps develop solid technical skills and facility with the Internet.

Class discussion is clearly not possible in this environment, a potential drawback. The Florida High School tries to replace classroom discussion with e-mail and a virtual "CourseRoom". The CourseRoom is a chat-room where students are expected to join in discussion of topics, asynchronously. This concept has the limitation of not effecting actual discussion, which is clearly hard to approximate, but fits within the overall motto of the school of 24/7 access, not limited by any schedule.

In addition to the Web-based services available to students, teachers are also accessible by telephone. Furthermore, some classes work with traditional bricks-and-mortar classes to support their activities, such as the drama class that eventually meets together with a non-Web class to watch a production.

The Florida High School claims that the overall approach is more student-centered than that offered in a traditional high school, since students are free to move at their own pace, without being required to stay with the group in-class discussions. In turn, it claims more success in developing higher learning skills as well as more practical, employment-related skills due to the technical literacy required to succeed.

Development

The FHS developed its Web capability through a partnership of public and private sources. As mentioned earlier, funding came originally from the federal Department of Education with a \$200,000 starter grant via the "Break the Mold" program. This was followed by a \$1.3 million appropriation from the Florida Legislature. The first \$1.5 million, however, primarily went to staff and curriculum development. Costs for the actual Web site development were approximately \$350,000, provided from in-kind donations from private sources, Lotus Development and IBM. A service provider, Interlialia, maintains and hosts the site on its servers in an ASP solution.

Technical problems often develop with the site, as noted on several of the pages. To overcome these, the School maintains a technical support staff (via Interlialia) that troubleshoots bugs.

Implementation

The Florida High School grew significantly in its first three years from 150 students in 1997, to 2,300 in 2000. Additionally, the number of school districts affiliated with FHS has grown to include all but two of the state's districts, and includes 3 charter and 25 private schools.

The "customers" of the site appear to be doing well in school, based on their high grades and test scores coming out of the program. In 1999-2000, 59% of all

students earned A's and 24% B's, a figure the School attributes in part to the extensive personal attention given each student (although it must be pointed out the FHS student body is probably not similar to a typical high school's). Advance placement scores are also impressive, with 72% passing these tests at FHS.

Costs are another matter, with Florida mentioning in its literature, "cost-effectiveness studies that focus only on dollars probably will not capture [all the] ... data." However, even if the school is not producing savings now, it is clear that the costs are decreasing as the school grows; there are clearly economies of scale for this sort of endeavor. It is also difficult to quantify the benefit side of the equation that will come over the long run due to improved grades and test results.

Analysis

The Florida High School project has been one of the most ambitious attempts to wed Internet technology and high school education. The school uses several progressive education methods, self-paced learning, personalized attention, and technology, and has achieved outstanding success in its graduation rates, average grades and success at placement exams. Similarly, educators have flocked to the program – the faculty has tripled over the course of the site's development – and report high satisfaction with the flexibility of the schedule and the motivation of the students.

Beyond the good marks from students and faculty, the School has built an infrastructure that will allow expansion over the years. Specialized courses hold particular promise for expansion, and seem to be a goal of the school, since traditional high schools that may not have on their own enough student interest for Latin or Economics can direct their students to FHS, and this offers a source of growth. In addition, the school has moved to offer a full range of courses with the goal of providing the complete high school experience for full-time students.

Florida's venture into cyberspace to create an entire high school is noteworthy because it pushes the envelope on e-government to offer an expensive and complex service over the Web. The danger is that the state, currently led by a fiscally-minded governor who vetoed a recent bill calling for education budget increases, may not have the patience to see out the expansion of the school to efficient, and money-saving, scale. Educators should hope this does not happen, and that FHS can continue to innovate.

3.4. THE CASE OF INDIANA

www.state.in.us/

Site provides residents with access to thousands of web pages and over 175 interactive services including income tax filings and renewal of professional or recreational licenses.

Indiana has one of the most (*siguiente página*)

comprehensive state sites: it serves customers well and can be used by all of its departments and agencies. Because a creative public-private partnership produced the site, the government did not incur development and capital costs.

Background

Recognizing the need to increase citizen's access to the government, but wishing to reduce the capital expenditures to government, Indiana formed a creative public-private partnership to deliver services over the Internet. Indiana contracted with a private partner who provided start up capital, covered development costs, as paid the costs of marketing and management of the site in return for the right to charge service fees to its customers. This enabled citizens to have one point of contact for all government transactions, and also deployed advanced technological resources without major capital investments to the state. In 1995, Indiana engaged in a public-private partnership with [Indian@Interactive](#), Inc. to form Access Indiana, the Internet portal for the state. Through Access Indiana, residents can utilize 130,000 web pages and engage in over 175 interactive services.⁴

Internet services provided through Access Indiana range from filing income taxes to renewals of professional and recreational licenses. One simple transaction that has resulted in significant savings is

the online physician license search. Hospitals, clinics, and physician's offices are required by law to verify the licenses of all health care providers: physicians, nurses, LPNS, and physical therapists. Prior to online verification, medical facilities had to contact the Health Professional Bureau and request verification of an employee's license. Then the office had to access the license, print a verification form and mail it to the requesting agency. Since accreditation requirements mandate that medical facilities update their licenses every two years, this resulted in at least 100,000 requests per year.

Three years ago, online verification of medical licenses simplified this process. Now, Access Indiana enables subscribers to access the state database of medical licenses and download the needed verifications immediately. Not only does this save the government money in printing costs but it also saves time for both state and medical personnel.

Development

In order to conduct this exchange, the Health Professions Bureau needed access to the technology that would support this process. The State of Indiana was able to obtain this infrastructure through the public-private partnership, Access Indiana. Instead of creating the infrastructure for

4. Personal e-mail communication with Robert Knapp, Director of Marketing for Access Indiana, July 18, 2000.

Internet transactions in-house, they utilized the technology and knowledge of the private industry. As [Indian@Interactive](#), Inc, the private partner is responsible for all capital and developmental costs, the State government incurs no capital expenses from this project. However, while the government has no financial investment in the project, the partnership insures that the state owns the site and has oversight powers with regards to content and transaction fees. The state established a governing board that reviews the transaction and subscription fees to ensure that the fees are reasonable and that the private partner complies with state policies and procedures.

The private partner is responsible for all costs, which they recoup through “market-driven convenience fees” on some of the services. Approximately 95% of the information on the 130,000 Internet pages is free, while approximately 5% of the services charge a fee. Most of these transactions traditionally carried a fee for the service or information provided through more traditional methods. The program uses a self-funded model that leverages the revenues of the portal to assist in the development of applications and content for agencies without using government funds.

Implementation

The online license verification process has completely eclipsed the traditional verification process due to its ease and convenience.

As a result, the Health Professions Bureau no longer verifies individual licenses through the traditional process. Instead, all transactions are accomplished through verbal verification over the phone or through Internet verification. In its first year, the program resulted in savings of \$86,000 in copier and paper expenses alone, not including savings in labor and postage. Furthermore, as there were no investment costs to implement this program, the savings to government were immediate.

This new transaction is not only easier and more convenient, but can also result in overall savings to medical facilities. With the traditional method, requesting parties could access 1 to 50 licenses at a time for \$30 or they could purchase the entire list of licenses following a renewal period. Before, undergoing the online license verification project, Access Indiana Information Network conducted a survey, where they found that on average, it cost the requesting agency \$3 to process a verification. This is because most agencies do not need to update 50 licenses at a time and with the traditional system you could not pay per verification. With online verification, hospitals or other large medical facilities can subscribe to Access Indiana for \$50 per year and that enables the facility to download verifications immediately for \$1 per verification. As a result agencies can save money by only having to pay for the verifications needed. Similarly, individuals do not have to pay the

subscription fee, and can access a verification for \$2.20 with a credit card.⁵

Analysis

The Indiana State government has created a system that can be used by all of its departments and agencies. This will alleviate any duplication that might otherwise occur if each department developed its own individual web-site, which happens in many states. This model results in governmental savings, as agencies and constituents have access to cutting edge technology without any capital expenses.

In addition, customers are more satisfied because they are able to access needed information more quickly and conveniently. Agencies are able to quickly access important information that previously took two to three weeks to obtain. Furthermore, hospitals now receive individual verification sheets for each licensee that can be placed in the individual's personnel folder, as compared to the older system with a sheet containing anywhere from one to fifty verifications.

In the future the Health Professional Bureau plans to expand the transactions available on the Internet. They are in the process of increasing the downloadable information on the web-site to include statutes and board rules. Furthermore,

they plan to make applications and other forms available via the Internet. This will reduce the amount of time lost between sending and receiving information and will result in additional savings in postage and staff time.

The public-private partnership between the government of Indiana and Indian@Interactive, Inc. has provided the government with the technological infrastructure to provide Internet services to the public, with no developmental or capital costs. As a result, Indiana has one of the most comprehensive state Websites without the expenditure of government's funds. The only people charged for this service are those who use the service. This is an important model that other states and larger jurisdictions would be well advised to at least consider.

3.5. THE CASE OF THE U.S. INTERNAL REVENUE SERVICE (IRS)

www.irs.ustreas.gov

Site enables individuals to file their taxes online and provides downloadable forms and instruction booklets.

The Internal Revenue Service's electronic filing initiative is faster, more convenient for customers and saves government money. Additionally, less paper use complies with the Paperwork Reduction Act.

5. Source of data in this section: personal e-mails from Herb Price, Systems Analyst for the Health professions Bureau, September 13 and October 2, 2000.

Background

The Electronic Tax Administration (ETA) is part of the Internal Revenue Service (IRS) and is critical to their mission, of providing quality service to American taxpayers in communicating better with the IRS. Every year the IRS receives over 200 million tax returns, over 1 billion information returns, issues 88 million individual returns, answers over 110 million assistance calls and collects \$1.7 trillion dollars. In light of the tremendous amount of customer transactions, the IRS's reliance on resource-intensive processes for interacting with taxpayers is costly. Paperbound and error-prone processes divert critical resources from areas such as customer service and compliance.

The ETA was created in 1986 to help revolutionize how individuals, businesses, and tax practitioners transact and communicate with the IRS. This includes how Americans file tax returns, pay what is owed, and receive assistance and information to comply with tax laws. In the late 1980's the IRS conducted its first pilot test of electronic filing. In 1986, approximately 25,000 individual tax returns were filed by a handful of professional tax practitioners. By 1999, thirteen years later, one out of every 4 individual tax returns is filed electronically.

Prior to 1986, all federal tax forms were filed through the mail. Individuals either prepared their own paper tax forms or they paid an accountant or tax practi-

tioner to prepare the forms for them. Individuals who prepared their own tax forms usually went to the library, the post office, or other government agencies where they could get copies of the forms needed along with lengthy instructions booklets for each form. While this method is still the most prevalent, increasing numbers of taxpayers are utilizing one of the three electronic methods to file their federal tax forms. Individuals can choose to file via the telephone utilizing the TeleFile system, over the Internet via a personal computer, or electronically through an IRS-authorized Electronic Return Originator (ERO).

While these new methods are more convenient for taxpayers, there are still many supplemental forms that cannot be filed over the Internet, and most transactions are not completely paperless. In 1999 one million taxpayers participated in two pilot projects, which enabled them to have a totally paperless filing experience. However, most taxpayers must still mail in W-2 forms, along with certain paper-only forms and schedules. As a result, many taxpayers continue to use the traditional mail-in method.

In addition to enabling individuals to file their taxes over the Internet, the IRS Website also provides downloadable forms and instruction booklets. Similarly, taxpayers can email questions to an IRS representative and a "What's Hot" page alerts taxpayers to current problems and issues affecting them. All of these new tools enable the IRS to reduce the amount of

paperwork that they produce to assist taxpayers. This is in accordance with the Paperwork Reduction Act that attempts to minimize the burden of federal paperwork demands through use of technology.

Development

Before taxpayers could file their taxes over the Internet, the IRS had to create the infrastructure to support these transactions. Much of the initial work was done in-house, however as the demand for e-filing has increased and the options available have become more complicated, the IRS recognized the need to rebuild the computing infrastructure of the ETA. At the end of 1998, the IRS awarded a contract to Computer Service Corporation and a team of leading technology and consulting firms to be major partners in managing the modernization of IRS's core business and technology systems.

In developing an e-filing system, there were many problems. For instance, the need for authentic W-2 forms, and the taxpayer's signature have deterred many filers from using the online options because they would be forced to send in the necessary paper after completing the online transaction. The ETA is dealing with this problem by conducting pilot projects that enable small numbers of taxpayers to work around these issues. By piloting different options, the ETA is able to determine the best ways to improve the system to make it more user friendly for everyone.

An additional barrier for e-filing, is the public's perception that they are more likely to be audited if they file electronically. To combat this obstacle, the ETA developed a marketing campaign that highlights this false perception. The campaign explains that audit selection criteria does not take into account how a return was filed. Furthermore, the campaign points out that those who file using traditional mail-in methods are actually 40 times more likely to receive subsequent contact with the IRS than those who file electronically. Another obstacle that ETA faces concerns the privacy and security of taxpayer's personal information. The ETA is working on safeguarding taxpayer's information. Simultaneously, they are streamlining forms to minimize the amount of personal information needed to file electronically. Finally, they are implementing pilot projects to develop a safe and secure method for using Personal Identification Numbers (PIN) to enable individuals to file electronically.

Implementation

In 1999, online filing increased 161% over 1998 filings with 2.5 million taxpayers utilizing this option. The IRS is projecting continued increases in the utilization of e-filing services, as the services improve and as customers become more familiar and more confident in electronic filing methods. In addition to the transactional increases, in 1999, the IRS homepage

Exhibit 3: Individual IRS Tax Filings⁶
(In thousands)

Year	TeleFile	Practitioner File (ERO)	Online File	Total IRS e-file	Total Tax Forms Filed
1998	5,955	17,669	942	24,580	1,225,000
1999	5,664	21,223	2,458	29,346	1,251,000
2000 (projected)	7,000-7,800	25,000-31,000 (projections combined)		33,600	1,269,000
2003 (projected)	8,000-9,6000	31,800-43,000 (projections combined)		44,100-45,600	1,321,100
2007 (projected)	9,400-12,700	40,000-57,000 (projections combined)		55,500-64,300	1,386,000

received over 1 billion hits for information or downloadable tax forms. The increased utilization of the Internet to provide instructions and information has reduced the amount of paperwork the IRS produces and processes.

In addition to decreasing the amount of paperwork, these new filing options have extremely high accuracy rates and customer satisfaction reports. The IRS has consistently achieved a 99% accuracy rate on all electronically filed tax returns, with a 99.2% rate in 1999. As a result, customer satisfaction is also very high. In 1999 the Russell Marketing Research, Inc. conducted a satisfaction survey on the three methods of e-filing. Of those who used the practitioner file and online file, 75% reported that they were “very satisfied”, coinciding with 85% of those who used TeleFile. Furthermore, when you included those who claimed that they were “somewhat satisfied” the scores increased to 95%

for practitioner file, 97% for online and 99% for TeleFile. These figures were confirmed by the President’s Management Council (PMC) Customer Service Results.

The IRS recognized that customer satisfaction was only one way to measure success, and therefore also conducted surveys to rate the satisfaction of tax practitioners and ETA employees with e-filing. The ERO survey found that tax practitioners believed that the e-file program was fast, accurate, and improved customer satisfaction. Of those surveyed, 75% were “very satisfied” with the practitioner file and approximately 95% were at least “somewhat satisfied” with this service. Similarly, employees were surveyed to determine their level of satisfaction on 12 different indices, ranging from training to empowerment to performance measurement. The overall scores on the 12 indicators ranged from a low of 55% to a high of 74%. The IRS is using the employee

6. All IRS Data drawn from: IRS, Electronic Tax Administration “A Strategy for Growth” , Washington D.C., December 1999.

Exhibit 4: IRS Transaction Costs⁷
(Unit cost per 30 million transactions)

Year	Mail-in Transaction	Electronically Filed Transaction
1999	\$4.28	\$4.14
2003 (projected)	-	\$3.50
2007 (projected)	-	\$2.00

survey and the information it uncovered to create new initiatives for employees, such as training programs and communication efforts. Furthermore, managers have incorporated the 12 indicators into their work groups and were held accountable for acting on the indicators in FY2000.

In addition to the high levels of satisfaction with the e-file methods, they also cost less than traditional mail-in services. In 1999, a unit mail-in transaction cost \$4.28 per 30 million transactions. Similarly, a unit e-file transaction cost \$4.14 per 30 million transactions. While these savings are relatively small, the projected savings over the next several years are much more significant (see Exhibit 2). These savings are based on the assumption that as the volume of e-transactions increases, the IRS should be able to amortize its fixed costs, which will allow the per transaction cost to decrease. Furthermore, the IRS also has a number of techniques to increase customer usage, which will in turn decrease unit costs. These include deploy-

ing an authentication approach, enabling debit and credit card payments, automating the ERO application and suitability process, and consolidating and modernizing service center assets.

Analysis

The Internal Revenue Service's electronic filing initiative must be judged a success. First, it is faster and more convenient for customers, thereby increasing their customer satisfaction. Similarly, it saves money per transaction. Furthermore, this project is in compliance with the Paperwork Reduction Act that attempts to replace paper transactions with paperless technological transactions. While most users are currently satisfied with their e-filing experiences, future enhancements should make the experience even better. Finally, this project is consistent with the goal of the federal government to increase the use of the Internet to provide government services.

7. Source: "A Strategy for Growth": OP. CIT.

Over the next several years, the ETA plans to make electronic filing, payment, and communication so simple, inexpensive, and trusted that taxpayers will prefer these methods to phone and mail options. They are currently developing a comprehensive plan to remove barriers, increase benefits, and broaden the appeal of electronic transactions to all segments of the population. IRS plans to expand the pilot projects that enable taxpayers to have a completely paperless filing process and to acclimate more individuals to this new option. Similarly, they plan to increase the number of forms and schedules that individuals can file online. This should increase the number of taxpayers opting to use one of the e-filing methods. The overall goal is to have 80% of individuals filing their taxes online by the year 2007. This increase in usage should result in large reductions in costs per transaction, because the fixed development and implementation costs will be spread across more transactions.

Over the last fourteen years the IRS, and specifically the ETA, have greatly improved electronic filing. They have expanded and enhanced the services provided. Both experience and new technology have contributed to better, more comprehensive options for taxpayers. With electronic filing customers and practitioners more satisfied, and costs per transaction are decreased. While the ETA improved e-filing significantly, there are many improvements to come. The ETA's

strategic plan outlines a comprehensive plan that should result in 80% IRS transactions occurring electronically by the year 2007. In order to accomplish this, they plan to continue to invest time and resources into the infrastructure and marketing of the project.

3.6. THE CASE OF TEXAS

www.state.tx.us/

Site streamlines the oil and gas permit process by improving communication and saving both time and money for government and private industry.

While this pilot program incorporates a long-term strategy to reduce administrative complexities and costs of drilling in Texas, initial results include a more flexible, accurate approval process that requires less time and money to complete.

Background

In 1998, the oil and gas industry in Texas was facing historically low oil prices and declining production. In an attempt to reduce the cost of regulatory processes and encourage the drilling of new wells, the Texas Railroad Commission in conjunction with the oil and gas industry that it regulates, proposed a pilot project to streamline oil and gas permits, the Electronic Compliance and Approval Process (ECAP). This technological solution is comprised of an integrated database linked to an Internet-based interactive permitting system. The overall goal is to use Internet

technology to improve communication, save money and time for both the Commission and industry operators, and to streamline regulatory compliance processes through electronic workflow systems.

The Commission chose the drilling permit application as the first transaction to streamline into a completely electronic process. It was the ideal transaction to use in the pilot project because it is complicated, involving signatures, electronic fund transfers, and record archiving and storage. In addition, it is the first step in regulatory process. Prior to the ECAP process, drilling permits were either processed through the mail or through an expedited walk-through process at the Commissioner's Austin office. It takes approximately 4 days to process mail-in applications, and an expedited mail-in application takes about eight hours. A walk-through application takes about two hours depending on the number of applications being processed on a particular day. The drilling permit process is linear in nature, thus delays are experienced in approvals of application, if one step in the process is not working or hits a bottleneck. Furthermore, once an application is approved, industry operators either wait several days while the approval is returned through the mail or they can pay the \$50 expedite fee. Finally, once applications are approved, they are either stored in paper format, which makes it difficult to access valuable information in the future, or the information is keyed into a computer database,

which is time consuming and can result in clerical errors.

In May 2000, the ECAP project provided an alternative method for industry operators to submit the drilling permit application. Now, the Commission utilizes the Internet to accept, file, review, and approve a portion of the approximately 15,000 drilling permit applications received per year. This new process not only reduces the amount of time and money spent processing an application, but also reduces errors and mistakes. The on-line application form asks for key data that enables the program to fill in other fields on the form. This streamlined application reduces the time spent filling out forms and increases the data accuracy. Similarly, it reduces the time spent processing incorrect forms and resubmitting corrections. Furthermore, the electronic application allows the various steps in the process to occur simultaneously, further expediting the process. Critical correspondence previously performed through the mail or in-person now take minutes through the Internet and permits are usually approved within 24 hours. Finally, the Commission receives data in the same format that it will be stored, eliminating the need to store paper documents or computerize paper data.

Development

The development process for this project is broken down into three separate phas-

es. The estimated cost for developing and implementing the entire ECAP pilot program is \$1.4 million. In February 1999, the Texas Railroad Commission received a \$700,000 grant from the US Department of Energy to use towards this project and in May 1999 the Texas Legislature appropriated \$1.4 million. This funding enabled ECAP to begin the developmental process and in April 2000 they completed the first phase. Phase 1 cost approximately \$333,000, which included contracting out the initial development costs including programming services to four independent contractors. The labor costs for this phase were based on 15 person months of programming time at \$100 for analysis and work design and \$75 for pure programming services. Capital expenditures, such as increased server storage capacity were estimated at \$37,000. The completion of this stage took approximately 8 months and now enables the Railroad Commission to accept, process, and approve drilling permit applications. This phase focused on building the primary infrastructure, such as secured system access, credit-card payments, mainframe database updates via the Internet, and limited on-line data validation and editing capacities.

In late 2000, the Electronic Compliance and Approval Project (ECAP) was working on the second phase of the pilot project, which would take approximately five months to complete and cost an estimated \$516,000. This phase expands the core systems to include full editing capa-

bilities and a comprehensive workflow system. It will require approximately 11 man-months of programming, for \$254,000, to enable the system to process more complex work permits. In addition, the procurement of commercially available workflow software would enable multiple processes to occur simultaneously. Software expenses and additional contracted programming services to adapt the software to the Commission's process were estimated at \$262,000.

The third and final phase of this project should take approximately 7 months to complete and is estimated at \$555,000. During this phase, contractors will complete the development process and will fully integrate the new system with the existing mainframe databases. This will enable ECAP to provide comprehensive on-line permit approvals. It will require approximately 5 man-months to complete and will cost approximately \$107,000. The main expense incurred during this phase is the procurement of a commercial bridging software, which will enable the new Internet based system to replace the manual process while still maintaining the accuracy of the Commission's files. The estimated capital expenditure, including hours required to implement and test the software is \$448,000.

During the three-phase development and implementation plan, contractors will participate in the maintenance of the site; however, they will be under the direction of Commission personnel. Once develop-

Exhibit 5: Estimated Costs of ECAP's Pilot Program⁸

ECAP	Labor	Capital	Total
Phase 1	\$296,000	\$37,000	\$333,000
Phase 2	\$254,000	\$262,000	\$516,000
Phase 3	\$107,000	\$448,000	\$555,000
Total Project	\$657,000	\$747,000	\$1,404,000

ment process is complete, the Commission staff will be responsible for maintaining the site. The on-going maintenance costs will be approximately \$322,000 per year.

The Commission encountered several obstacles through the initial phase of development. These included delays in the government procurement process and compatibility issues with change technology. As a result, they established a project management team that reviewed the impact of the varying problems and developed solutions. For instance, when dealing with technical compatibility issues, they defined change management processes and escalation procedures. In addition, they ensured that future steps in the project had contingency plans and timeframes for sufficient testing of application issues.

Implementation

Since phase one was completed in May of 2000, one consulting firm and thirty-four

organizations have filed the necessary agreements and security forms required for utilizing the ECAP system. However, there are over 8000 operators in the state, so the Commission expects more registrations to occur in the following months. Since the ECAP project was actually initiated by industry operators and not the Commission, high enrollment is expected to follow, as operators become more familiar with the new system. Similarly, once industry operators realize the savings that will result from this new approval process, more will register.

During the development phase of this project, the Commission worked with industry representatives to determine the administrative savings that operators will realize when applying for permits electronically. They determined that the reduction of processing and approval time would result in a \$200-400 savings per permit. If there is a 25% utilization of electronic filing, then total annual industry savings is expected to reach \$17 million.

8. Source: The Railroad Commission of Texas, "ECAP (Electronic Compliance and Approval Project)" Report, December 15, 1998.

This saving helps meet the Commission's goals of decreasing industry costs in an effort to ensure continued drilling in Texas.

While savings for industry operators is the primary goal of the ECAP project, the Commission projects savings for the government in later years. Initially, the Commission will have to maintain two application processes until the electronic process is completely operational. However, once the system is finalized, the streamlined approach will save the government time and money, especially as capital costs are dispersed among more transactions.

Analysis

This project will immediately begin to meet the Commission's overall goal to reduce the administrative costs for industry operators. The electronic process not only saves time and money for the government and private industry; it also provides a more flexible and accurate approval process. In addition, permit information is more consistent and accessible due to the database system.

The Commission should complete the second phase of the ECAP project by the end of 2000, which will allow the processing of more complex drilling permits and attachments. This addition should increase the utilization of electronic filing. Similarly, utilization and savings should increase further as the third phase is completed. Phase 3 is scheduled for comple-

tion by September 2001, ending the development process and resulting in a fully integrated database system. Once the system is complete, the Commission plans to expand ECAP to include compliance permits and performance reports. The goal is to have a 50% paperless regulatory environment by the year 2005.

Over the last two years, the Railroad Commission has worked closely with industry operators to develop a streamlined permit application process. The project was primarily driven by the private industry and should result in savings for operators and eventually for the government. Utilizing the expertise of private operators enabled the Commission to create a comprehensive, long-term strategy to reduce administrative costs of drilling in Texas.

3.7. THE CASE OF UTAH

www.utdcfsadopt.org/index.html

One of the first state-sponsored online adoption sites, it serves as a matching tool that aids families in finding a child. Basic information is provided at first, and a password-protected area is available to key individuals working with families interested in sensitive details.

Utah's effort to make the social services side of government more efficient is distinctive: e-government activity to date focuses on easing the administrative burdens. Future plans include accessing other states' adoption listings and more links to supportive resources such as medical sites.

Background

The State of Utah, in an effort to improve the information market for adopted children, has developed the Utah Child and Family Connection. The Adoption Exchange, a private non-profit organization, has helped to set up an online database of adoption information, essentially a matching tool that allows families to enter their information and criteria and find the child that most fits these criteria. Similarly, the Department of Child and Family Services caseworkers can find matching families or screen interested applicants. The goal is to have the system clear children and families from the list more quickly, and have a repository of the most recent information always available.

Although other sites are following suit, Utah's is one of the first state-sponsored online adoption sites. In the site, all children in the state are listed who are legally free for adoption. The information on the children, completed by the agency in charge of each child, is presented to the families searching the database. Basic information is provided at first, and a password-protected area can be accessed with information that is more sensitive. Only key individuals working with the families could access this information.

The goals of the Website are as to:

- Decrease the time children must wait in foster care for a permanent family;

- Increase the ease of accessing possible families for waiting children;
- Make it easier for social workers to find out about possible families for their children statewide;
- Encourage workers to consider families outside their own geographic region;
- Decrease the time approved families wait for the placement of a child.

For families, the site provides links to resources supporting the adoption process, as well as explanation of technical terms ranging from adoption terms to medical and mental health terms, again with further links if more information or support is needed.

For children and their caretakers, the site works on two tasks simultaneously. The child's information is entered, and the caretaker can view information on the families that express interest. Since the caretaker is likely to be part of the larger network of child care providers in the state, social workers can use the site to communicate with the caseworker (if any) who is supporting the family, or with the family directly. Furthermore, and significantly, social workers from outside the state can use the site, and even obtain a password via e-mail if needed.

Some of the service provided is similar to services available pre-Web, since many organizations kept databases of available children. However, the Internet truly has the potential to accelerate the process of finding homes for children, as well as

broaden it. The Web also allows families to complete the entire process from their home computers, with more privacy as well as efficiency, finding all available resources, definitions and information.

The site was developed from an idea from the Utah DCFS, which wanted to offer a capability similar to that of the National Adoption Exchange, and improve on the functionality of that site (by offering, for example, the matching tool). In addition, the state wanted to be able to manage the adoption process in Utah more efficiently.

Development

The site was created at relatively low cost, primarily because the Adoption Exchange set it up using its own facilities and equipment. In total, the costs amounted to just under \$25,000, and maintenance is estimated at \$13,000 per year. The State pays the hosting fee to the Adoption Exchange. The Adoption Exchange remains responsible for the site, and to date has not encountered any problems with its functioning, again perhaps due to the fact it is an extension of the Exchange's Web offering.

Implementation

So far, the information on use for the Utah site is anecdotal. The project manager is working to train caseworkers across the state of Utah to use the site and communicate with other caseworkers in the state

on the site itself. Interestingly, although cost may be a criterion for evaluation of some sites, the Utah group is unconcerned about the cost/benefit analysis of the adoption Website. The Project Manager, Kathy Searle, indicated that the primary focus of the Utah site is to find homes for kids.

Analysis

Much e-government activity to date focuses on easing the administrative burden of constituents, making it easier to do things like pay parking tickets or get tax forms. While these functions may please more of the people more of the time, there has been relatively little use of the Web to make the social services side of government more efficient. The Utah site is an effort to do this.

In the future, the site plans to access other states' listings, so that children and families will not be limited to Utah alone. Additionally, the site will offer more links to supportive resources such as medical sites.

4. CONCLUSIONS AND RECOMMENDATIONS

The seven cases we analyzed indicate that the Web can serve as a mechanism for improving government service delivery.

While some of government's development of web based services has followed thoughtful planning more often Web-based services are developed without a business plan and without costs and ben-

efit analysis. The principle conclusion of this study is that government must obtain management assistance when they begin to develop these web-based services. Consulting firms and experts with experience in launching these new ventures should be hired by any government organizations that are planning to deliver service using the Web. An assessment of costs and benefits should be conducted which should be used to shape the form of the site, the services offered, the fee structure and timing.

The potential of the World Wide Web for government is great, but should not be overestimated. Just as Barnes and Noble bookstores benefit from having both virtual physical stores, government should assume that different type of customer needs should be addressed through different modes of interaction. Face-to-face contact and physical presence is sometimes required for effective transactions. Web-based service delivery can relieve pressure from the physical “store”, by removing some general traffic and people who’d rather “shop at home”. It can also save money when properly managed.

Even if Web-based government services were a bad idea, many government would still need to explore them due to citizen demand. Fortunately, there is ample evidence that the Internet can be a valuable aid to government. It is important to ensure that services are carefully planned, and that costs and benefits are constantly evaluated. Poorly planned Web-based services can increase an agen-

cy’s costs without significantly improving citizen satisfaction. The Internet is a tool and not a cure-all. It is a complex undertaking. When used with care it can help government improve its ability to serve the public. Its use however, is not self-justifying and it is not self-implementing.