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The Use of the Internet in Government Service Delivery



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The PricewaterhouseCoopers Endowment for

The Business of Government

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Foreword

February 2001

On behalf of The PricewaterhouseCoopers Endowment for The Business of Government, we are pleased to present this report by Professors Steven Cohen and William Eimicke, "The Use of the Internet in Government Service Delivery." The report is the eighth in our e-government series. It is an excellent companion piece to the recently published Endowment report by Genie Stowers, "Commerce Comes to Government on the Desktop: E-Commerce Applications in the Public Sector," which also examines the use of the Internet by government organizations across the nation.

This report describes how six different government organizations — at various levels of government — have effectively implemented web-based services to citizens. By drawing on the experiences of Alaska's Department of Motor Vehicles, the City of Boston, Florida's Online High School, Access Indiana, the Texas Electronic Compliance and Approval Process for oil and gas permits, and the Internal Revenue Service's electronic filing system, the authors develop a series of lessons learned about implementing web-based services.

Professors Cohen and Eimicke recommend that government organizations analyze the costs and benefits of providing services via the Internet. Although much can be gained in productivity and more convenient service to the public via web-based services, careful planning and evaluation of these services are needed.

We trust that this report will provide government organizations throughout the country with valuable insights into planning, piloting, and evaluating web-based government services.

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Executive Summary

Governments have begun to use the World Wide Web to assist in service delivery. This includes, but goes far beyond, the dissemination of information to the general public and involves a variety of other governmental functions. In reviewing some government websites it is clear that the use of the web for service delivery is still in its infancy. The types of services that can be delivered through the web are still in the process of being imagined and organized by both government 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.

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 websites and, where available, an analysis of the costs and benefits of switching to web-based service delivery. We selected cases in Alaska, the U.S. Internal Revenue Service, the city of Boston, Florida, Indiana, and Texas. We discuss the lessons learned from these cases and their broader implications for government service delivery. Then we provide a checklist of the steps that governments should take when using the Internet to deliver government service. Finally, we present background on the websites we reviewed, discuss the development

and implementation of the site, and analyze its costs and benefits.

To produce the six case studies reported in this study we contacted well over 50 government organizations that had websites we considered well developed and that provided citizens with a direct service. We found that less than 15 percent of the government organizations we contacted had collected data on the costs and benefits of using the web as a means of delivering services. Very few of these organizations had analyzed the costs and benefits of using the web before launching their sites.

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. We also found that electronic service delivery could change human resource deployment patterns and improve 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 website. A second source of revenue for electronic service provision is savings generated from reduced costs.

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

The report discusses the following set of steps that governments should undertake in order to implement web-based services:

1. Create a web strategy.
2. Identify, describe, and analyze the operational steps of the service that is being considered for web-based delivery.
3. Benchmark against similar services in other jurisdictions or organizations.
4. Develop a pilot project to test web use in one district or in one element of the service.
5. Analyze the results of the pilot project.
6. Develop options for instituting wide-scale web-based delivery of the service.
7. Conduct a costs and benefits analysis of piloted alternatives.
8. Select an option.
9. Develop a data collection system for operational performance of the service, its costs, and benefits.
10. Analyze performance data, costs, and benefits.
11. Perform periodic reviews of service delivery, then modify the web format and operations.

The report described and analyzed web-based services in six locations:

CASE 1: Alaska. Accommodates two Department of Motor Vehicles (DMV) transactions: renewing motor vehicle registrations and ordering personalized license plates.

CASE 2: Boston. 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.

CASE 3: Florida. An online high school that seeks to build on and expand the traditional idea of the online school and can serve any student in the state.

CASE 4: Indiana. 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. Because a creative public-private partnership produced the site, the government did not incur development and capital costs.

CASE 5: The U.S. Internal Revenue Service. Enables individuals to file their taxes online and provides downloadable forms and instruction booklets.

CASE 6: Texas. Streamlines the oil and gas permit process by improving communication and saving both time and money for government and private industry.

Introduction*

Background

A wide variety of governments have begun to use the World Wide Web to assist in service delivery. This includes, but goes far beyond, the dissemination of information to the general public and involves 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 line and submit a paper form could be delivered through 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 adjudication processes to be delivered through the web.

* The authors are grateful for the research assistance of our students in Columbia University's Graduate Program in Public Policy and Administration: Candace Winkler (lead researcher), Kelly Christensen, and Lisa Dimas.

The types of services that can be delivered via 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.

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 websites and, where available, an analysis of the costs 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 the level of customer satisfaction as well as the effectiveness and efficiency of the services they deliver. The specific research questions we address include:

1. What content does government in the United States now provide on the web?
2. What transactions with government can customers use the web to complete?
3. What government services are provided through the web?

4. How are these services funded? What are the costs and benefits of service delivery through the web?
5. What new information and services do they plan to deliver through the web over the next one to two years? Over the next three to five years?
6. Do governments plan to increase the use of e-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, Florida, Indiana, and Texas. We discuss the lessons learned from the cases and their broader implications for government service delivery. Then we present a checklist of the steps that governments should take when utilizing the web to deliver services. Finally, we provide background on the websites we reviewed, discuss the development and implementation of each site, and analyze its costs and benefits.

Lessons Learned from the Cases: Implications for Government Service Delivery

In researching these cases we discovered that most governments in the United States are 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 websites and believe that a systematic sample survey should be conducted. Nevertheless, to produce the six case studies reported in this study we contacted well over 50 government organizations that had websites we considered well developed and that provided citizens with a direct service. We found that less than 15 percent of the government organizations we contacted had collected data on the costs and benefits of using the web as a means of delivering services. Very few of these organizations 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”; website

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 of 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 improve 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 website. Many government licenses, permits, and services require user fees. An additional fee can be charged for the convenience and potential time/labor savings of online 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 capable and

comfortable enough to use it. The benefits of reduced service costs will tend to occur in a different fiscal year from 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 six 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, academics, and other 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 offered, 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.

A Checklist for Using the Internet to Deliver Services

1. Create a web strategy

There is evidence to suggest that development of a strategy is one of the most important factors in developing successful technology applications (Christensen and Hughes, 2000; p. 564). A structure for developing such a plan should be as simple but comprehensive as possible (see for example, Cohen and Eimicke, 1998; pp. 15-29). Some of the key steps include a problem and opportunity analysis, establishment of clear priorities, identification of key players, and an organizational and situational analysis. To ensure that the process achieves widespread organizational buy-in under a cross-functional task force.

2. Identify, describe, and analyze the operational steps of the web-based delivery service

When government is considering the use of the web to deliver a service that is now performed in-person, by phone, or by mail, the first step is to develop a complete description and then analysis of the method(s) in which the service is currently performed. Follow these steps:

- a. Interview or hold a group meeting with individuals who implement the service. Ask them

to make a flowchart of the steps involved in service delivery. The flowchart should include details on steps, time to complete tasks, and delays. It should note who does what and when.

- b. Circulate the flowchart for comments from individuals with knowledge of the process.
- c. Revise the flowchart to reflect comments.
- d. Analyze the flowchart for disconnects and waste, and the critical path.
- e. Identify targets for web-based delivery.
- f. Project potential savings in cost and time and potential benefits to customers in cost and level of satisfaction. A key factor to consider is whether customers will be comfortable using a higher level of technology to complete these activities and how long it might take to achieve that level of comfort. In a public sector environment, such technological innovations must follow the annual budget cycles and fit within two- or four-year election political cycles if partial funding and failed implementations are to be avoided.
- g. Identify potential risks in adopting a web-based service structure and develop appropriate risk-management strategies.

Based on the research in this report, we have identified a set of steps that governments should undertake in order to implement web-based services:

1. Create a web strategy.
2. Identify, describe, and analyze the operational steps of the web-based delivery service.
3. Benchmark against similar services in other jurisdictions or organizations.
4. Develop a pilot project to test web use in one district or in one element of the service.
5. Analyze the results of the pilot project.
6. Develop options for instituting wide-scale web-based delivery of the service.
7. Conduct a costs and benefits analysis of piloted alternatives.
8. Select an option.
9. Develop a data collection system for operational performance of the service, its costs, and benefits.
10. Analyze performance data, costs, and benefits.
11. Perform periodic reviews of service delivery, then modify the web format and operations.

3. Benchmark against similar services in other jurisdictions or organizations

Most government functions are not unique to a particular jurisdiction. We often can learn important lessons about policy, management, or service operations by visiting with colleagues in other towns, counties, states, or nations. Even in our own location we may find an organization performing a similar or related function from which we can learn. While not everyone is open to allowing their operations to be

observed, imitation is the most sincere form of flattery, and most organizations permit benchmarking visits. In order to benchmark a function for web-based service delivery follow these steps:

- a. Conduct a web search to identify similar programs with web presence.
- b. Review existing websites (or a sample of sites) from those identified.
- c. Conduct an informal survey of key contacts in other jurisdictions and organizations to identify those with a reputation for excellence on the web.
- d. Identify the top five to 10 websites and seek appointments with the managers and technical staff responsible for developing and maintaining the site.
- e. Develop an interview guide for key questions and subjects to be covered during benchmarking interviews.
- f. Conduct field research.
- g. Project team members should use the site themselves and create a list of advantages and weaknesses.
- h. Analyze research and develop a list of key factors to emulate and avoid in your own web-based service.
- i. If your web-based application does go forward, revisit the current benchmark sites in the future to periodically update and upgrade your services.
- j. Among the categories to include in a benchmarking survey, Christensen and Hughes (2000, pp. 566-567) provide a very useful list, including customers, contact information, graphics, page design and presentation, content, speed, hardware, software, development, personnel, maintenance training and user support, and web hosting (if outsourcing is considered).
- k. The agency's legal affairs group should ensure that the materials and pictures posted as well as the links made do not violate any intellectual property laws and do not even imply (through its links) that the agency is exceeding its legal authority or jurisdiction.

- l. The agency's technology staff must assess the security risks inherent in web access to certain databases and develop a fail safe plan to protect confidential and sensitive information from unauthorized use.
- m. Human resources staff must assess the initial and ongoing training that will be needed to launch the contemplated web-based applications, maintain them, and use them.

4. Develop a pilot project to test web use in one district or in one element of the service

A pilot test is a small-scale experiment, limited in duration, with performance data collection and analysis built in. Before moving to delivery of a service on the web, government agencies should experiment with elements of a service or with an entire service in a particular geographic area, or a "trial site" labeled explicitly as an experiment. It is important that the web-based service be fully integrated into the organization's standard operating procedures. Information provided online must be accurate, and actions promised through the web must be carried out. Records cannot be lost and servers cannot be unreliable. A pilot test allows the organization to experiment and innovate, but is small enough in scale that mistakes can lead to institutional learning instead of organizational scapegoating or destruction. The downside of pilot testing is that it takes a great deal of work to launch even a relatively modest web-based pilot. Therefore, care should be taken to choose a test service or area that is particularly important to the organization and its mission. If the pilot is successful, the potential benefits of system-wide change will be more clear.

5. Analyze the results of the pilot project

A web pilot test should address the following questions:

- Does the web-based version of the service provide adequate and appropriate service?
- What is the level of customer satisfaction with the service? How does it compare with other modes of delivery?

- What are the unit costs for the web-based service? How does it compare with the costs of service delivery in other media?
- Does the organization know how to operate the web-based service? If not, how will they learn?
- What improvements should be made before wide-scale implementation of the service is begun?

The answers to these questions will facilitate the development of a high-quality, customer-oriented and cost-effective web-based service. The analytic strategy should be designed to address the operational issues involved in developing a web-based service. Overall, proponents of web-based technology stress better, faster, and cheaper service. In practice, the benefits seldom live up to the initial promises and frequently do not achieve results in each of the three categories. Managers need to consider whether the innovation can be justified even if it is not cheaper but faster and better, or some other combination of those three key elements of success.

6. Develop options for instituting wide-scale web-based delivery of the service

The analysis of the pilot project should generate three to five web-based service options. There might be different levels of graphic complexity, site design might vary, the intervals for content updates might be different, access to various databases, e-mail, downloading and print options, forms and printed materials might vary, there are server options, different internet connections, and a wide variety of server and site management software choices. Personnel choices include network administration, user application support, technical support, programmers, hardware maintenance, and telephone help personnel. There is also the possibility of outsourcing some or all of these activities. Finally, there's the issue of what kind of training to offer and whether it will be ongoing. These options can form additional pilot tests or can be exposed to focus groups. The options should be developed sufficiently that they can be seen as discrete choices.

7. Conduct a costs and benefits analysis of piloted alternatives

Before deciding on an option, it should be analyzed for costs and benefits. It should also be compared with non-web-based services. The unit costs of web-based services will come down as more people learn about the service and as more people become web proficient. The cost-side analysis should include more than dollars and cents. It is sometimes difficult to price the effect on morale of relief from tedious clerical tasks through automation. It is also difficult to price opportunity costs as freed-up labor is devoted to other more creative and possibly more important tasks.

Moreover, technological change may threaten some employees, disrupt work patterns and communications flows, and raise user expectations well beyond the capacity of the organization to respond. Confidentiality and privacy issues may also arise as internal and external users have more access to the organization's databases.

On the benefit side of the equation, the analysis should factor in increased speed and accuracy of service delivery, and increased customer satisfaction. Web-based access to public agencies has the potential to make government much more open and transparent to all interested public audiences. Sites also have the potential to be interactive, giving citizens the opportunity to comment, make requests, and/or receive additional and customized information. Employee morale may rise as organization members get positive feedback from customers, feel more empowered and effective, and take pride in working for a more "cutting edge" organization. Managers must also recognize that the impact of technology on organizations is evolutionary. What begins as a benefit in terms of relief from routine requests for information may turn into a new cost, as consumers realize what kinds of information the organization may be capable of providing.

8. Select an option

Once the analysis is completed, an option should be selected and wide-scale web-based service can begin. You should expect that the initial option you

select will evolve along with the service itself and changes in computer technology, capacity, software, and graphic design. It is important that the service be permitted to change and not get locked in to a particular design. You should program resources, including management time, for periodic review and redesign of the site and service. To do this effectively and manage a web service, you must measure the performance of the service delivery system.

9. Develop a data collection system for operational performance of the service, its costs, and benefits

When the web-based service is being developed, it is important to design performance measures and mechanisms for collecting, reporting, and analyzing these data. The first step is to decide on the appropriate performance measures. How can we measure the service's costs and benefits? What are our goals? How can we track accomplishments? What type of data on customer satisfaction do we need to collect? Developing a performance measurement system includes standard operating procedures for collecting and reporting data and a periodic analysis by management of the meaning of the data. Some of the data should be collected as a routine part of accessing and delivering the services. Counts of web hits on particular pages can be counted automatically. Counts of specific services provided and response times can also be counted automatically. Measures of customer satisfaction can be placed on the web site or automatically e-mailed to customers on a random basis or to an entire population.

Performance measures should be designed up-front to avoid expensive retrofits and to ensure that longitudinal data can be collected. Performance will hopefully improve over time and early measures can help develop an accurate baseline. This is not to say that measures should not be changed and added as the service delivery system evolves. However, to the extent possible, you should attempt to anticipate the evolution of the service system and develop measures that can be used for a long period of time.

10. Analyze performance data, costs, and benefits

As noted above, the analysis of service system performance should be a regular organizational function. In commercial retail operations, data on store sales is transmitted directly from cash registers to analysts and from analysts to management. In some cases the reporting is automatic and simply sent electronically directly to management. The reporting of performance data on the government web-based service should emulate the private sector. Key measures should be sent to management on a frequent, predictable basis.

In addition to simple reporting of data, analysts should prepare periodic trend analyses and identify problems, opportunities, and successes that are worthy of management attention. Problem analysis should be presented with potential solutions as well as work plans for pilot testing and implementing improvements. The analyses should be designed to be as straightforward as possible, in an attractive, easily understood format, to facilitate the use of the information by management.

To properly assess the impact of web-based solutions on organizational performance, public managers need to assess the impact of the innovation in terms of the organizational goals, existing performance measurement indicators, public approval rating, media image, legislative profile, and reputation with the chief executive. Measures need to be taken at regular intervals and performance assessed over time, among divisions and services, and across relevant geographical boundaries.

11. Perform periodic reviews of service delivery, then modify the web format and operations

The purpose of the performance measurement system is to allow management to improve performance and to ensure that improvement targets are derived from data rather than "common wisdom." The most effective organizations hold high-priority periodic service reviews with key personnel and senior management in attendance. These reviews provide deadlines for analysis and a regular cycle of reporting, analysis, and decision making, leading to continuous improvement. A specific portion of the

review process should focus on web-based service delivery. During reviews of web-based service delivery, it would be useful to include technical personnel who can discuss potential system modifications as well as limits to modifications. While we are in the early stages of web-based public services, research to date indicates that quality is critical to the favorable impact of such technological innovations (Specht, 2000; p. 148).

The above checklist provides a road map to organizations considering using the web to deliver services now delivered in other ways. We hasten to note that we are still learning how to develop and manage this new technology, and we expect that over the next several years we will need to expand and modify these steps. There is a great deal we need to learn about this topic. A decade ago there were fewer than 100 sites on the World Wide Web; we do not want to even guess how many sites will be in existence a decade from today.

The Case Studies

This section reviews the case data that informed the analysis and discussion presented earlier in this report. These cases represent success stories and are among the very few examples of governments that conducted cost analyses before launching online services.

CASE 1: Alaska’s Department of Motor Vehicles

Background

Motivated by negative newspaper articles, long lines, and dissatisfied customers, Governor Tony Knowles of Alaska issued an executive order in January 1997 to reengineer 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) renewing 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 had conducted these two transactions through the mail or through in-person counter transactions in the DMV offices. Registration

Alaska’s DMV
website: www.state.ak.us/local/akpages/ADMIN/dmv
Description: Alaska provides two Department of Motor Vehicle (DMV) transactions on the web: renewing motor vehicle registrations and ordering personalized license plates.
Assessment: 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.

renewals through the mail could take anywhere from several days to three weeks. Similarly, ordering personalized license plates through the mail took from four to six 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 1½ 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, and enables 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 five minutes between 8:30 a.m. 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 setup costs \$300,000.

ITG employees are responsible for maintaining the site, which costs approximately \$440 per month (three hours per week of analyst programmer time at \$100 and \$40 per month of regular employee 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 percent 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 percent of the vehicle registrations for that year. During the first half of 2000, I/M stations completed 25.7 percent 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 its inefficiency and long lines. While the DMV did not formally measure customer satisfaction with the Internet transactions, it has 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.

Table 1: Automobile Registration Renewals in Alaska^a

Year	Number 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%

Notes:

^a Data appeared in an unpublished memorandum sent from Mary Marshburn, director of the Department of Motor Vehicles in Alaska, on 6/14/2000.

Table 2: Cost of Automobile Registration Renewals in Alaska^a

Type of Transaction	Direct Labor ^b	Direct Materials ^c	Overhead ^d	Development Cost	Credit Card Cost	Total Unit Cost
Counter	\$4.15	\$0.11	\$3.48	—	—	\$7.74
Mail-in	\$1.56	\$0.48	\$1.31	—	—	\$3.35
E-service	\$0.52	\$0.53	\$0.40	\$0.85	\$1.32	\$3.62

Notes:

^a 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.

^b Direct labor costs are assumed to consist of 80 percent 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.

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

^d 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.

In addition, most customer e-mails are no longer negative, but tend to thank DMV “for the most pleasant vehicle registration process of my life” and for “an outstanding, informative, and useful web-site.” 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.

In addition to these improvements, the Internet services also cost less than the in-person transactions. An Internet registration renewal costs \$3.62 to process 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 turnaround time. Furthermore, as more individuals use e-services, they will become more cost effective because the primary incremental expense is the credit card cost, which decreases when a higher volume of transactions is completed.

Analysis

This project was worth doing because customers are more satisfied with the speed and convenience of the new e-services. The Internet allows customers to perform transactions in a variety of different venues, which increases access to DMV.

Similarly, employees 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 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 driver’s licenses and address changes online. By increasing services provided over the Internet, the entire program becomes more cost effective. Furthermore, as services are new, there is still room for improvement. Currently, about 95 percent of a transaction is completed through the Internet, with only five percent 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, its goal is to have transactions that are 100 percent 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 its specific transactions, which has resulted in a significant amount of duplication and competition among 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 affects 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.

CASE 2: The City of Boston

Background

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

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 information pertinent to his or her needs. Visitors, for example, can find out historical information on the city, the locations and hours of popular tourist sites, 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 online using a

The City of Boston

website: www.ci.boston.ma.us

Description: Boston's 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 a dog license, and more.

Assessment: 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.

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

The development costs also included 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.

However, city staff, is determined that the website not be driven by costs, and to keep tight control over 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 site is a success. According to the site's manager, many features have shown significant increases in use since the site was launched. Motor vehicle excise tax payment, for example, increased by 300 percent from mid-1999 to mid-2000. In the year 2000, an average of 3,000 tickets were paid over the Internet each month. Although no specific data were provided to us, people managing the site believe that it saves the 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 6,000 payments were made online during the first year of service, collecting about \$500,000. The time that 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 creates an opportunity for more efficient staff allocations.

Analysis

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

CASE 3: The Florida Online High School

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

The Florida Online High School
website: www.fhs.net
Description: The 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.
Assessment: 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.

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 virtual 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, Florida students. These specialized programs have been available for some time; before online, they were available in disk form, 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 online. The U.S. 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 website, the project's mission is "to place a complete high school online by the year 2001 and 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 on 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 them to explore 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 chatroom 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 brick-and-mortar classes to support their activities, such as the drama class that eventually meets together with a traditional 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 website development were approximately \$350,000, provided from in-kind donations from private sources, Lotus Development, and IBM. A service provider, Interalia, 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 them, the school maintains a technical support staff (via Interalia).

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

Costs are another matter, with Florida mentioning in its literature that "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 costs are decreasing as the school grows, reflecting the

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 on 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 enough student interest for Latin or economics can direct their students to FHS. 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 of e-government to offer an expensive and complex service over the web. The danger is that the state may not have the patience to see out the expansion of the school to an efficient and money-saving scale. Educators should hope that this does not happen and that FHS can continue to innovate.

CASE 4: Access Indiana

Background

Recognizing the need to increase citizens' 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 and covered costs of developing, marketing, and

Access Indiana

website: www.state.in.us

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

Assessment: Indiana has one of the most 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.

managing 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, while deploying 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.¹

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 Professions 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

¹ Personal e-mail communication with Robert Knapp, director of marketing for Access Indiana, July 18, 2000.

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 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 ensures that the state owns the site and has oversight powers with regard to content and transaction fees. The state established a governing board that reviews the transaction and subscription fees to ensure that they 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 percent of the information on the 130,000 Internet pages is free, while approximately 5 percent of the services charge a fee. Most of these transactions carried a fee when the service or information was 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.

Not only easier and more convenient, this new transaction can also result in overall savings to medical facilities. With the traditional method, requesting parties could access one 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 that found, 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, enabling the facility to download verifications immediately for \$1 each. As a result agencies can save money by paying only for the verifications needed. If individuals do not wish to pay the subscription fee, they can access a verification for \$2.20 with a credit card.²

Analysis

The Indiana state government has created a system that can be used by all of its departments and agencies. This alleviates any duplication that might otherwise occur if each department developed its own individual website, 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, which is an improvement over the older system with a single sheet containing anywhere from one to 50 verifications.

² 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.

In the future, the Health Professions Bureau plans to expand the transactions available on the Internet. It is in the process of increasing the downloadable information on the website to include statutes and board rules. Furthermore, it plans 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 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.

CASE 5: The U.S. Internal Revenue Service Electronic Tax Administration (ETA)

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 U.S. taxpayers. Every year the IRS receives over 200 million tax returns and over one billion information returns, issues 88 million individual returns, answers more than 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 1980s the IRS conducted its first pilot test of electronic filing. In

The Internal Revenue Service ETA

website: www.irs.ustreas.gov

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

Assessment: 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.

1986, approximately 25,000 individual tax returns were filed by a handful of professional tax practitioners. By 1999, 13 years later, one out of every four 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 practitioner 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 instruction 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 e-mail 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 increased and the options available became 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 into a two-step process: sending 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 make the system more user friendly for everyone.

An additional barrier to 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 dispels 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, it is streamlining forms to minimize the amount of personal information needed to file electronically. Finally, it is implementing pilot projects to develop a safe and secure method for using personal identification numbers (PINs) to enable individuals to file electronically.

Implementation

In 1999, online filing increased 161 percent 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 with and more confident in electronic filing methods. In addition to the transactional increases, in 1999 the IRS homepage received over one 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 percent accuracy rate on all electronically filed tax returns, with a 99.2 percent 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 percent reported they were "very satisfied," compared with 85 percent of those who used TeleFile. Furthermore, when you included those who claimed that they were "somewhat satisfied," the scores increased to 95 percent for practitioner file, 97 percent for online, and 99 percent 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

Table 3: Individual IRS Tax Filings^a (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

Notes:

^a All IRS Data drawn from: IRS Electronic Tax Administration's "A Strategy for Growth," Washington D.C., December 1999.

surveyed, 75 percent were "very satisfied" with the practitioner file and approximately 95 percent 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 percent to a high of 74 percent. The IRS is using the employee 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 Table 4). 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 deploying 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

Table 4: IRS Transaction Costs^a

(Unit cost per 30 million transactions)

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

Notes:

^a Source: "A Strategy for Growth": *op. cit.*

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.

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 percent of individuals filing their taxes online by the year 2007. This increase in use should result in large reductions in cost per transaction, because the fixed development and implementation costs will be spread across more transactions.

Over the last 14 years the IRS, and specifically the ETA, has greatly improved electronic filing. It has 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 are 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 percent IRS transactions occurring electronically by the year 2007. In order to accomplish this, it plans to continue to invest time and resources into the infrastructure and marketing of the project.

CASE 6: Texas Electronic Compliance and Approval Process (ECAP)

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 streamline regulatory compliance processes through electronic workflow systems.

The Commission chose the drilling permit application process as the first to transform into a completely electronic transaction. 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 any 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 office in Austin. It takes approximately four 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 being processed on a particular day. The drilling permit process is linear in nature, thus delays are experienced 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.

Texas ECAP

website: www.rrc.state.tx.us/ecap

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

Assessment: 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.

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, it also reduces errors and mistakes. The online 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. 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 takes 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 phases. 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 U.S. Department of Energy to use toward 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 it completed the first phase. Phase 1 cost approximately \$333,000, which included contracting out the initial development costs, such as 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 eight 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 secure system access, credit-card payments, mainframe database updates via the Internet, and limited online data validation and editing capacities.

In late 2000, ECAP was working on the second phase of the pilot project, which is projected to take approximately five months to complete and cost an estimated \$516,000. This phase expands the core systems to include full editing capabilities and a comprehensive workflow system. It will require approximately 11 person-months of programming, or \$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 seven 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 online permit approvals. It will require approximately five person-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 development process is complete, the Commission staff will be responsible for maintaining the site. The ongoing 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 changing technology. As a result, it established a project management team that reviewed the impact of the varying problems and developed solutions. For instance, when dealing with technical compatibility issues, it defined change management processes and escalation procedures. In addition, it ensured that future steps in the project had contingency plans and time frames for sufficient testing of application issues.

Implementation

Since Phase 1 was completed in May 2000, one consulting firm and 34 organizations have filed the necessary agreements and security forms required for utilizing the ECAP system. However, there are over 8,000 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. Together they determined that the reduction of processing and approval time would result in a \$200 to \$400 savings per permit. If there is a 25 percent utilization of electronic filing, then total annual industry savings is expected to reach

Table 5: Estimated Costs of ECAP's Pilot Program^a

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

Notes:

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

\$17 million. These savings help meet the Commission's goals of decreasing industry costs in an effort to ensure continued drilling in Texas.

While saving money for industry operators is the primary goal of the ECAP project, the Commission projects that savings for the government will be realized 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 expects to 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 completion 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 percent paperless regulatory environment by the year 2005.

Over the last two years, the Texas 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.

Conclusions and Recommendations

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

While some of the government sector's development of web-based services has followed thoughtful planning, more often web-based services have been developed without a business plan and without cost and benefit analysis. The principal conclusion of this study is that governments must obtain management assistance when they begin to develop these web-based services. Experts with experience in launching these new ventures should be hired by any government organization that is planning to deliver service using the web. An assessment of costs and benefits should be conducted that then 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 and physical stores, governments should assume that different types 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 governments 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 agency'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.

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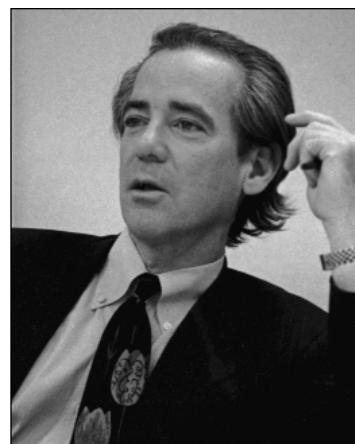
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