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State Web Portals:
Delivering and Financing E-Service

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The Business of Government

E-GOVERNMENT SERIES

State Web Portals: Delivering and Financing E-Service

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FOREWORD

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On behalf of The PricewaterhouseCoopers Endowment for The Business of Government, we are pleased to present this report, "State Web Portals: Delivering and Financing E-Service." The report includes two Endowment grant studies, one by Diana Burley Gant and Jon P. Gant, and the other by Craig L. Johnson.

In Part I, Professors Gant and Gant examine how state governments across the nation are enhancing the delivery of e-services to citizens. Their report presents findings from their examination of the functionality of all 50 state web portals, evaluating their content and features across four dimensions: openness, customization, usability, and transparency.

In Part II, Professor Johnson presents his findings from a survey of 33 states that examined how states are financing the development and maintenance of their web portals, as well as their pricing strategies for the delivery of e-service to citizens.

All three authors note that e-service offers numerous opportunities for states to use the Internet and web-based technologies to extend government services online, allow citizens to interact more directly with government, employ customer-centric services, and transform the provision of traditional government services. Professors Gant and Gant identify five states—California, North Dakota, Maine, North Carolina, and Pennsylvania—with web portals that exemplify outstanding e-service to citizens. The five states were identified for their achievements in making online information, contacts, and services available to a diverse citizenry.

The studies provide many insights into the two major challenges now facing all states: providing easy and accessible e-services and obtaining adequate funding to provide those services. We trust that this report will assist states and other government organizations as they work to enhance their e-services to citizens and to develop viable financing and pricing strategies.

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Part I:
Enhancing E-Service Delivery

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EXECUTIVE SUMMARY

This study examines how state governments use web portals to enhance electronic service (e-service) delivery. A web portal serves as the integrated gateway into a state government website and provides visitors with a single point of contact for online service delivery within the state. Because portals integrate state e-service, they can improve access to government, reduce service-processing costs, and enable state agencies to provide a higher quality of service.

We examined the functionality of all 50 state web portals by evaluating their features and content across four dimensions: openness, customization, usability, and transparency. Briefly, *openness* is the extent to which a government website provides comprehensive information and services, *customization* indicates the extent to which users can create uniquely tailored views of the portal content, *usability* refers to the accessibility of the content for a range of users, and *transparency* indicates the ease with which users can assess the legitimacy of the content. High-functioning web portals are those incorporating features in each of the dimensions. The more features included on the web portal, the higher the level of functionality of the portal.

Reporting the results of a comprehensive content analysis of the 50 U.S. state portals, we discuss the status of the portals during the spring of 2001.

Major study findings include:

- Top states provide online access to services, contact information for key agencies, and have developed portals that are usable by most of the constituents of the state. The top five states are: California, North Dakota, Maine, North Carolina, and Pennsylvania. At the other end of the spectrum: New Jersey, South Dakota, West Virginia, Nevada, and Tennessee are more limited in their portal functionality.
- More progressive states organize online service delivery around events (vehicle registration) rather than departments (Department of Transportation) to facilitate user access. However, although state web portals provide the promise of a one-stop shop, most states have not yet reached this goal.
- It is not the lack of online service availability that limits the functionality of early-stage portals. Rather, usability issues hamper the value of the portals for e-service delivery. For instance, we found that many portals fail to include basic contact information.
- Although the ability to display customized content is one of the key benefits of web portals, most states do not yet provide constituents with the ability to create customized views.
- States created their portals to reach the mainstream audience, but have adapted their portals to make them accessible to the wide range of constituents they serve.
- Most state portals do little to instill constituent trust.

These findings represent the status of state web portals during a single snapshot in time. Given the ever-increasing demands of the public and the growing technological capabilities of the states,

web portals remain in a constant state of development. Regardless of the current state of portal development, the findings presented here should provide some guidance for state officials as they work to deliver the highest level of e-service to their constituents. Accordingly, we make several recommendations to states in the midst of portal development.

Major recommendations include:

1. *Emphasize customer service.* The benefit of e-service delivery via the web portal is that it provides more convenient access to state services and information for constituents. To that end, states should include features that facilitate portal use.
2. *Organize services by event rather than department.* Recognize that the average citizen does not understand nor care to figure out the bureaucracy of government. Structuring the portal around events rather than agencies can provide better service to the user.
3. *Allow for customization.* The value of the portal for e-service delivery lies in its ability to provide easy access to relevant content. Two facts are clear: (1) the set of information and services provided by a state is vast, and (2) what is important to one constituent may be irrelevant to another. Thus, to efficiently present information to portal visitors, states should allow users to personalize both the display and content delivered through the web portal.
4. *Recognize the diversity of your portal audience.* As the Internet becomes a more widely used tool, states must recognize that the diversity of their portal visitors will continue to increase. Providing good e-service means creating a web portal that is accessible to all constituents of the state. And these constituents include members at both ends of the technological sophistication spectrum.
5. *Include features that enhance the legitimacy of the portal.* Do not assume that portal visitors will automatically trust the accuracy of portal content or the validity of transactions performed through the portal. State portals should include features such as security and privacy statements, content update procedures and dates, contact information for the person or office responsible for web portal content, proper acknowledgment of transactions (receipts), and even independent third-party endorsements of the portal.

Introduction

This study examines how state governments are using web portals to enhance electronic service (e-service) delivery. Until recently, state governments developed their web presence on an agency-by-agency basis with little tendency to develop an integrated website that linked all state resources to a central location. While this strategy allowed them to create websites quickly, it did little to serve the needs of an increasingly web-savvy public. Under growing pressure to be more responsive to citizen needs, state governments now are rethinking their web strategy and reconfiguring their existing websites into web portals.

At present, most state government portals provide basic information on state agency policies and access to a limited set of state services such as tax filing and car registration. However, as the public moves more of its daily activities online, expectations for online access to government information and services will also rise. Further, because over 167 million U.S. adults (Nielsen netRatings) from all demographic and geographic segments of the population use the Internet, state governments must simultaneously provide breadth and depth in the content they provide.

Thus, to truly serve all web constituents, state governments must build intelligent portals that include information on state policies, access to state agency services, and the ability to customize the information to meet their specific needs. It is not surprising, then, that state and local government spending on e-government initiatives totaled more than $1 billion in 2000 (*Governing Sourcebook 2001*). The challenge for policy makers and technology leaders is to find the right level of portal functionality while still maintaining fiscal responsibility.

Defining Web Portal Services

A web portal serves as the integrated gateway into a state government website and provides visitors with a single point of contact for online service delivery within the state. Because portals integrate state e-service, they can improve access to government, reduce service-processing costs, and enable state agencies to provide a higher quality of service.

Web Portals and E-Service Delivery: the Status of the States

The objectives of this research are to assess the level of functionality for each of the 50 U.S. state web portals and to provide a benchmark by which future developments in e-service can be judged. By combining an extensive content analysis of each of the portals with prior research on web portals, we characterize the content and structure of the portals along four dimensions: openness, customization, usability, and transparency. Taken together, these dimensions represent the key aspects of a portal's functionality.

Drawing upon prior research in e-government and discussions with key state government and technology industry officials, we identify the role that

portals can and will play in e-service delivery. To illustrate how states use web portals to enhance service delivery, we discuss the five state web portals offering the most comprehensive level of e-service. These e-service leaders—California, North Dakota, Maine, North Carolina, and Pennsylvania—not only provide online access to a variety of services through their portals, but they also promote open and equal access to government. These state web portals exemplify citizen-centric e-service delivery.

We then summarize key findings on the functionality of state web portals and their role in e-service delivery, and suggest recommendations for state web portal development based on these findings. Importantly, however, we must note that the findings presented in this report represent the status of state web portals during a single snapshot in time, during the spring of 2001. Given the ever-increasing demands of the public and the growing technological capabilities of the states, web portals remain in a constant state of development. Regardless of their current state of portal development, the findings presented here should provide some guidance for state officials as they work to deliver the highest level of e-service to their constituents.

E-Government

There has been growing interest in understanding ways in which public sector organizations can use information technology (IT), particularly applications delivered over the Internet, to improve service delivery and relationships with citizens. The search for more effective methods of delivering public services began in the early 1980s in most industrialized countries. In the United States, for example, the National Performance Review (NPR) recommended that government agencies "re-engineer government activities, making full use of computer systems and telecommunications to revolutionize how we deliver services" (NPR, 1993, p. v). The Access America Plan issued in 1997 strengthened this commitment to IT: "The NPR and Access America call for new IT-based information systems and improvements in the process by which they are managed to implement specific reforms in programs ranging from health care to law enforcement" (Heeks, ed., 2000, p. 232).

Heeks (2000) identified three main factors that have contributed to this phenomenon: (1) an unsustainable level of public expenditure that did not produce efficient public services (due to waste, delays, mismanagement, corruption, or poor organizational and management skills); (2) a resurgence of neoliberal thinking emphasizing the efficiency of market competition and the need to make government more businesslike; and (3) the rapid development of IT and the increasing awareness of the value of information systems (IS).

Although governments use a variety of information technologies to support these initiatives, the use of integrated websites or web portals is increasingly becoming an important component of e-government. E-government refers to efforts in the public sector to use information and communication technologies to deliver government services and information to the public. E-government offers numerous possibilities to use the Internet and web-based technologies to extend government services online, allow citizens to interact more directly with government, employ customer-centric services, and transform operational and bureaucratic procedures.

The adoption of the World Wide Web by governments is the focus of a growing number of studies. Demchak, Friis, and LaPorte (2000) suggest that the adoption of the web for delivering government services will catch on rapidly as more websites are built with greater openness and effectiveness. West (2000) reports that while government organizations are adopting the web as a tool for delivering government services, government at all levels is not making full and effective use of commonly available information technology. And Hart and Teeter (2000) show that there is increasing public support for state governments to develop online government services further. These studies look at the web in general. We build on these earlier studies by focusing on the web portal and its relationship to the rest of the website for state governments and focus particularly on how web portals can be used to enhance government service delivery.

Web Portals

A web portal serves as the integrated gateway into a state government website and provides both external constituents and internal government personnel with a single point of contact for online access to state information and resources. State governments are complex organizations with hundreds of agencies, departments, commissions, and regulatory bodies. Portals are web-based front-end applications that allow state governments to access and manage all of their data and information, and to deliver it to its users. Through this gateway or main user interface, millions of web users can access the vast landscape of information, services, and applications available on state websites.

Since the mid-1990s, when the first portals appeared widely on the Internet, their features and functions have evolved significantly. Many refer to the first wave of portals as "dressed-up search engines." Commercial portal pioneers such as Yahoo!, Lycos, Excite, and AOL organized on a single web page a directory of interesting websites along with general interest information. These early portals matured quickly and increased their functionality by adding advanced search capabilities, enriched content, and increased user control. The latest portals do much more. Portals now have a robust collection of functions including robotic crawlers that dynamically push categorized information onto the web page; tools that access integrated data from distinct enterprise applications and platforms; applications that customize website content; and other key features such as e-mail, calendars, instant messaging, and chat areas.

Given the extraordinary potential for integrated, customized information delivery, portals are now being used by private sector firms, nonprofit organizations, and governmental agencies. In fact, governmentwide web portals are emerging as a key priority for government agencies as they develop their electronic government initiatives and create electronic relationships between government and citizens (G2C), government and business (G2B), government and its employees (G2E), and government and government (G2G). The portal is the centerpiece of enterprise approaches to e-government. The challenge for government organizations is to determine which features are most appropriate for creating high-functioning e-government portals.

The Evolution of Web Portals

Web portals are web-based front-end applications that provide an integrated gateway into a website.

- The first wave of portals, in the early 1990s, was little more than a group of dressed-up search engines.
- The second wave of portals increased functionality by incorporating advanced search capabilities, enriched content, and increased user control.
- The third wave of portals now includes functions such as robotic crawlers that dynamically push categorized information onto the web page; tools that access integrated data from distinct enterprise applications and platforms; applications that customize website content; and communication features such as e-mail, calendars, instant messaging, and chat areas.

The promise of the web portal as an integrated access point to all relevant information is undeniable. Because databases and existing departmental systems are often housed on different platforms, the World Wide Web is a convenient infrastructure to use as the foundation for the transfer of data, statistics, and records across organizational boundaries. As a coordinated entryway into systems and shared databases, a web portal can provide significant cost and time savings. For example, a child welfare employee can, in less than one hour, check a juvenile's statewide history of school attendance, medical history, and interaction with the justice system prior to foster-home placement. Without this integrated system, the employee may have spent days or even weeks trying to contact the appropriate parties and access the information (IBM, 2001). This underlying system integration is one feature that distinguishes web portals from large-scale websites. The extent of the integration, in addition to a host of other factors, determines the level of functionality of the web portal.

Web Portal Functionality

High-functioning government web portals are designed to search, classify, and present relevant information, and to integrate applications at three levels of complexity: (1) information publishing and linking of existing websites, (2) single-agency transactions, and (3) transactions requiring integration of multiple agencies (IBM, 2001). High-functioning portals include tools to register, dynamically recognize, and classify users, thus giving agencies the ability to customize content, information access, and structure to meet the specific needs of an individual. When creating a high-functioning web portal, organizations use the portal features to promote open data access, customization of portal content, usability of portal features, and transparency of information.

State Portal Functionality

To assess the level of state government portal functionality, we conducted a comprehensive content analysis of the 50 U.S. state web portals in the spring of 2001. Using a 131-item portal evaluation questionnaire adapted from standard website evaluation questionnaires to incorporate both generic website evaluation criteria, as well as specific questions relating to public sector websites, we assessed the level of web portal functionality based on four dimensions: openness, customization, usability, and transparency.

Defined below, each of these dimensions represents a key aspect of portal functionality. Openness provides a comprehensive measure of service availability. Customization specifically addresses the role of web portals, as distinct from general-purpose websites, to provide targeted information and services to individuals and groups. Usability is a fundamental design issue for web development teams; and in no realm is general usability more important than in the public sector, where the fundamental role of e-government is to increase the access of all constituents to government services. Transparency indicates the extent to which governments are working to gain constituent trust online. Although the underlying concepts are discussed in a number of studies, we adapt the terms "openness" and "transparency" from Demchak et al.'s (2000) study on the role of the web in governance and democracy.

Based upon our assessment of the website evaluation literature used by public sector and library science researchers, we suggest that these dimensions accurately capture and categorize the key features of web portal functionality. We define high-functioning web portals as those portals that incorporate features in each of the dimensions. The more features included on the web portal, the higher its level of functionality.

Openness

Openness refers to the extent to which a government website provides comprehensive information and services, and maintains timely communication to all key public audiences (Demchak, et al. 2000). The more "open" a website, the more facts, figures, services, and other pieces of information are viewable either through direct reprint on the portal or a link to a website containing the information. In some cases the portal contains links to internal state government agencies. In other cases, the links redirect the portal visitors to an external website such as a federal government agency or a non-governmental organization. The decision to reprint or link to data is often made based on portal space and design constraints, data availability, or the goals of the portal.

To measure the openness of each of the state web portals, we examined the availability of state information and services through the web portal. We recorded the number and types of services available, the number of steps required to perform these services, and the extent to which personal data followed users through their use of portal services.

Table 1: Assessment of web portal functionality of U.S. state websites

State Name	Customization	Openness	Usability	Transparency	Overall Score	Rank
Alabama	None	Low	Medium	Not adequate	19.4	33
Alaska	None *	Medium	Medium	Not adequate	22.5	28
Arizona	None *	Medium	Medium	Not adequate	25.8	26
Arkansas	None *	Low	Low	High	31.3	15
California	High	Low	Medium	High	72.7	1
Colorado	None *	Low	Medium	Not adequate	19.6	31
Connecticut	None	Low	Medium	Not adequate	16.5	39
Delaware	None *	Low	Medium	High	41.3	9
Florida	None *	Low	Medium	Medium	29.0	16
Georgia	None	Low	Medium	Medium	29.0	16
Hawaii	None *	Medium	Medium	Not adequate	22.5	28
Idaho	None *	Medium	Medium	Not adequate	29.0	16
Illinois	None	Low	Medium	Not adequate	16.5	39
Indiana	None *	Medium	Medium	Not adequate	29.0	16
Iowa	None *	Medium	Medium	Not adequate	27.3	24
Kansas	None *	High	High	Medium	54.2	7
Kentucky	None *	High	Low	Not adequate	28.5	22
Louisiana	None *	Medium	Low	Not adequate	18.8	37
Maine	None *	Medium	High	High	60.4	3
Maryland	None *	Medium	Medium	Not adequate	25.6	27
Massachusetts	None *	Medium	Medium	Not adequate	29.0	16
Michigan	None	Medium	Low	Not adequate	19.2	36
Minnesota	None	Low	Medium	Not adequate	19.4	33
Mississippi	None *	Low	Medium	Not adequate	19.4	33
Missouri	None	Low	Medium	Not adequate	16.5	39
Montana	None	Medium	Low	Not adequate	15.8	45
Nebraska	None	Not adequate	High	Not adequate	16.7	38
Nevada	None	Not adequate	Low	Not adequate	0.0	49
New Hampshire	None	Low	Medium	Not adequate	16.5	39
New Jersey	None	Medium	Low	Not adequate	12.5	46
New Mexico	None	Not adequate	Medium	High	38.3	10
New York	Low	Medium	Low	Not adequate	27.1	25
North Carolina	High	Low	High	Medium	59.6	4
North Dakota	Low	High	High	High	71.9	2
Ohio	None	Medium	Low	Medium	34.6	12
Oklahoma	None *	Medium	Low	Medium	28.3	23
Oregon	None	Low	Medium	Medium	32.1	13
Pennsylvania	High	Low	Medium	Medium	57.1	5
Rhode Island	None *	High	Low	Medium	37.7	11
South Carolina	Low	Medium	Medium	High	55.8	6
South Dakota	None *	Not adequate	Medium	Not adequate	10.0	47
Tennessee	None *	Not adequate	Low	Not adequate	0.0	49
Texas	None *	Medium	High	Not adequate	31.7	14
Utah	None *	Low	Medium	Not adequate	16.3	43
Vermont	None *	Medium	Medium	Not adequate	29.0	16
Virginia	High	Low	Medium	Medium	44.8	8
Washington	None *	Low	Medium	Not adequate	19.6	31
West Virginia	None *	Low	Low	Not adequate	6.3	48
Wisconsin	None *	Low	High	Not adequate	19.8	30
Wyoming	None *	Low	Medium	Not adequate	16.3	43

** While the portal does not provide customized information, it does allow the user to link to a community of choice and access community-specific information.*

Each state is assigned a score in the table above that reflects the following hierarchy, from best to worst: high, medium, low, and not adequate.

One-Stop Service Shops

Openness is a key component of web portals as it underlies the idea of the portal as a one-stop shop for state government e-service. States design their web portals to serve as a main gateway to government information and services. As such, we found that all 50 state government web portals contain at least one direct link or search engine access to state agencies. Constituents can monitor pending legislation in their state legislatures through 46 portals. They can follow judicial proceedings through 38 state portals, and gain access to the executive branch through 45 state portals. In addition, 29 state portals provide access to nongovernmental websites that support state activities such as the Red Cross or United Way.

We found that 36 states allow web visitors to complete at least one state agency transaction online. The transactions most often supported through the web portals are tax filing, vehicle registration, and professional licensing. Other transactions include recreational licensing and fee payments.

Web Portals as a One-Stop Service Shop

Thirty-six states allow citizens to complete at least one transaction online. The most popular e-service offerings are:

	Number of States
Taxes	
Form download	42
Tax advice	38
Tax filing in conjunction with mail filing	35
Complete online filing when refund expected	29
Complete online filing when payment necessary	23
Vehicle registration	
Form download	11
Complete online registration	16
Professional licensing	
Form download, information access	50
Partial online registration	25
Complete online registration	2

Taxes

For a growing proportion of citizens, filing state taxes, obtaining tax information, and accessing tax forms online is a desired service. A full 42 of the state portals contain links to state tax websites through which users may download tax forms and tax instruction brochures, and 38 states offer online tax advice. Across all states, it takes an average of two mouse clicks to go from the web portal to the state tax website to begin a session where the user can ask for information, obtain forms, and file taxes online.

Filing taxes online through the web portal is also a common function. In fact, 35 state web portals have links that allow users to file taxes online. Often, however, taxpayers must still complete their tax filing through the mail—either by sending a tax payment or a refund request. Only 29 states actually allow citizens to complete the transaction online when they expect a refund, and the number dwindles to 23 states when the tax filer owes tax money. Completing the tax payment online requires that the state web portal be equipped to handle credit card payments or some form of electronic payment.

Vehicle Registration

Nearly all of the state web portals have links that will carry the visitor to general information about vehicle registration laws and information. However, only 27 states actually allow car owners to register a vehicle through their web portal: 16 states allow car owners to complete the registration process online, the other 11 states require owners to download and mail the registration form. Web visitors find that it is relatively convenient to register a vehicle online. Across all 27 states, it takes an average of 1.4 clicks to start the vehicle registration process from the web portal.

Professional Licensing

Obtaining professional licenses is almost as common to do online as registering a vehicle, with 25 states allowing web visitors to start the process for obtaining a professional license online. The range of professional occupations varies considerably

by state. Online license applications for cosmetologists, health professionals, engineers, and architects are the most common—available from all 50 state portals. Most states make it easy to download application forms, and to access information and instructions for their completion. Only Maine and California allow applicants to complete the entire registration process online for two or more occupations.

Customization

Customization refers to the ability to create user-specific content, layout, and display. All web portals provide generic content tailored to meet the needs of the average portal visitor. However, more sophisticated web portals give users the ability to create customized views that provide personalized content organized in a way that meets the direct needs of each user. The power of the web portal lies, to a large extent, in its ability not only to consolidate information but also to provide that information in a specialized manner.

We measure web portal customization based on the ability of web users to uniquely tailor views based on user registration data, to identify themselves with distinct user groups (for example, specific community members), and based on the extent to which the web portal dynamically recognizes these user groups and displays specialized content for them.

State Portal Customization

Surprisingly, only a small number of states give portal users the ability to personalize design and content. North Carolina, Pennsylvania, and California allow portal visitors to create personal profiles, to customize portal features and content based on these profiles, and to identify themselves with multiple constituent groups. Virginia's e-government

Figure 1: California, http://www.state.ca.us/state/portal/myca_homepage.jsp

California claims the top ranking by successfully creating a customizable, one-stop service shop that gives users the ability to perform a host of tasks, from updating vehicle registration to making campsite reservations, through a uniquely tailored view of the portal features and content.

portal also gets high marks for personalization and customization because its site allows users to create a personal profile and customize the portal content based on that profile. In fact, Virginia's portal is often used as a national example for providing targeted content to specific user groups. South Carolina and North Dakota also have limited personalization and customization capabilities on their portals.

Usability

Usability refers to the ease with which users can access and navigate around the web portal. A well-designed portal delivers value to the user as a function of how accessible and usable the features on the site are. Well-designed portals have pleasant interfaces that are easy to use. It is also critical that the visual aspects use these features in a common design across the portal and linked pages so that the underlying interface elements are relatively constant.

Another determinant of web portal usability is the extent to which the portal is accessible to all constituents of the state. Unlike private companies, which can develop their web portals to meet the needs of a carefully defined target audience, states must develop their web portals to provide equal access for all. Constituent groups include permanent residents, temporary residents (students, for example), businesspeople, and tourists. Contained within each of these constituent groups are members who may be visually or hearing impaired, members for whom English is a second language, and members with other special needs. Some constituents may want to access the web portal with new wireless technologies such as Personal Digital Assistants (PDAs), while others may gain access through basic computers running early versions of web browsing software.

This wide range of development criteria is a challenge from both the technological and content perspectives. However, to effectively meet the needs of all of their constituents, it is vital that states develop their web portals in a manner that truly does provide equal access. We measure web portal accessibility using a content analysis of the state web portals and applying the Web Content Accessibility guidelines developed by the World Wide Web Consortium (W3C).

To measure the usability of the state web portals, we recorded features that increased the ease of use of the portal, making it easy to navigate and find necessary information. These features included intuitive menu systems, site maps, new information indicators, search tools, common state logo, uniform masthead, and dynamically generated list boxes. We also measured the level of accessibility of the portals by recording features such as help sections and FAQs.

In addition, we performed a Bobby analysis on each state web portal. Bobby is a web-based analysis tool, developed by the Center for Applied Special Technology (CAST), that identifies existing or potential problems with the structure and content of a website for a person with special needs. For example, a visually impaired user may need to have an audio soundtrack added to a video demonstration.

To become "Bobby approved" and earn the right to display a Bobby logo, the website must meet the criteria outlined in the W3C's Web Accessibility Initiative (WAI) Web Content Accessibility Guidelines. Included in these criteria are text equivalents for all images and multimedia items, black-and-white alternatives for colors, data table headers to facilitate line-by-line reading, chart and graph summaries, logical organization of content, alternative content for advanced technological features, and browser compatibility.

State Portal Usability

Portals deliver value to the user as a function of the accessibility and usability of the portal features. The seven most usable web portals include nearly all of the usability features discussed above. The states are Kansas, Maine, Nebraska, North Carolina, North Dakota, Texas, and Wisconsin.

Well-designed portals also ensure access to the portal for users of different skill levels and abilities. Users visiting the Alabama and South Carolina web portals are offered the most help and training. Other state portals that lend a helpful hand to users by offering good online help and new user training include Iowa, Kansas, Kentucky, Michigan, Nebraska, North Dakota, Texas, and

Table 2: State web portals that failed the Bobby test of accessibility criteria for disabled users

State	Number of Bobby Errors	Most Frequent Error(s)
Alabama	48	Need to provide alternative image text, potential screen flicker
Louisiana	43	Need to provide alternative image text, missing data table headers
Kentucky	27	Need to provide alternative image text
Montana	26	Need to provide alternative image text, missing data table headers
West Virginia	21	Need to provide alternative image text, provide color alternatives, extend image descriptions
Ohio	20	Need to provide alternative image text
Arkansas	18	Need to provide alternative image text, potential for screen flicker
Nevada	17	Need to provide alternative image text, provide color alternatives
Oklahoma	15	Need to provide alternative image text
New Jersey	14	Need to provide alternative image text
Michigan	10	Need to provide alternative image text
Rhode Island	5	Need to provide alternative image text
New York	3	Need to provide alternative image text
Tennessee	2	Need to provide alternative image text
South Carolina	1	Need to provide alternative image text
Iowa	1	Failure to include table headers

Wisconsin. States such as Florida, New York, North Carolina, and Indiana offer limited help features. Surprisingly, 16 state web portals do not offer any form of help.

A small number of state portals use multiple languages to communicate with the users. Four states—Iowa, North Carolina, Texas, and Virginia—give users the option to view content in languages other than English or provide an option for online language translation.

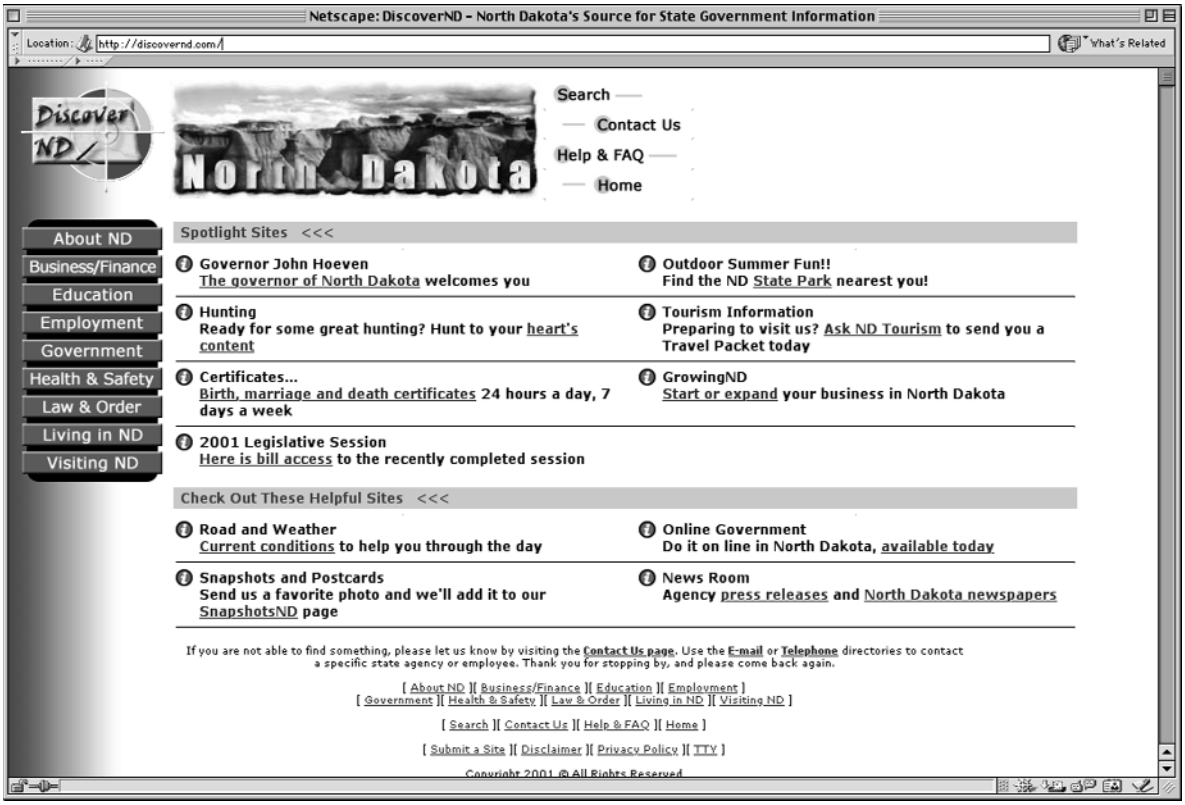
Based on the Bobby criteria, we found that only 34 of the 50 state web portals adequately serve users with disabilities. A total of 16 states have portals with features that do not provide reasonable access to a significant number of disabled users. These portals fail to include alternative image text to explain images to visually impaired users, often do not have table headers to facilitate reading, and have problems with content structure. States with the most egregious errors include Alabama and Louisiana. Table 2 lists the states that failed the Bobby test and the number and most frequent type of major errors found on these portals. It is also important to note that not even the 34 states that passed the Bobby test are error free. Many of these portals have minor problems relating to the use of graphic images.

We examined each web portal for features that allow users to interconnect with peripherals such as PDAs, other wireless applications, interactive voice response, and call center support. These technologies extend access to the portal beyond a computer and open up new opportunities to interact with state government. Virginia is the only state that allows users to download information from the state web portal to a PDA. North Carolina's web portal supports interactive voice response and call center support.

Transparency

Transparency indicates how easy it is for users to assess the legitimacy of the portal content. Information such as key agency personnel contacts, the

Figure 2: North Dakota, http://www.state.nd.us or http://www.discovernd.com



Top-notch in all aspects of functionality, the North Dakota portal is exceptional in its usability. Not only is the portal layout simple and easy to use, but the portal also provides comprehensive online help and searching capabilities, as well as new user training for inexperienced web users.

person responsible for online content, feedback procedures, date of last update, and security and privacy policies is vital for users to trust the accuracy of portal content. Even government agencies must work to establish this trust online.

To measure web portal transparency we examined each portal for content and features designed to confirm the legitimacy of the portal and its interconnected websites, services, and information. We identified whether the user could easily determine the responsible authority for the portal and its content along with the accuracy, objectivity, currency, and coverage of the content and information published on the portal. We examined the portal for features and/or content that indicated the person or agency responsible for the portal, its content, and its technical support, as well as appropriate contact information.

To gain public trust, high-functioning web portals should employ these transparency features. For instance, states can earn the confidence of constituents by incorporating typical aspects of offline transactions in the online environment. As with buying groceries, paying bills, or even registering a car with a department of motor vehicles office, each person completing a transaction online should be able to obtain a receipt or other certification. Surprisingly, this simple yet important feature of every offline transaction is supported by only eight states. Only citizens transacting business through the portals of Arizona, California, Delaware, Maine, New Mexico, North Carolina, North Dakota, and South Carolina are able to generate a receipt from a completed transaction.

We also examined the security and privacy features contained on the web portals. Following the trend

Enhancing Web Portal Legitimacy

Only a few states effectively incorporate features to increase their online legitimacy.

	Number of States
Transaction receipts	8
Passwords	13
Security statement	10
Security statement and password	5
Privacy policy	32
Security statement and privacy policy	8

of high-quality e-commerce websites, we expected a state portal to post a statement of its security policy or an independent security certification, particularly if the web portal launches you into applications that require personal information. However, we found that only 10 of the state web portals currently post a security statement. Password protection for personal information was equally rare. We found that 13 states use passwords on their portals, and only five state portals—California, Kansas, Kentucky, Maine, and Maryland—use passwords and also post a security statement. A similar story exists for privacy statements. We found that 32 of the states include a privacy statement on their web portal. However, only eight states—California, Hawaii, Kansas, Kentucky, Maryland, Maine, New Mexico, and Utah—provide both a security and a privacy statement.

State Web Portals and E-Service Delivery

When states incorporate features from all four of the functionality dimensions—openness, customization, usability, and transparency—they create high-functioning web portals and enhance the value of these portals for e-service delivery. Based on the number of features included from each of the four dimensions, we ranked the states according to the level of web portal functionality. For purposes of this report, we treated all dimensions as equally important and calculated the state portal functionality score as the aggregate of the scores on each dimension. We then ordered the states according to this functionality score and ranked them accordingly. State portal performance on each dimension, overall portal functionality score, and rank are presented in Table 1 (see page 13).

Below, we discuss the states leading the way in e-service delivery. For each dimension of portal functionality, we describe the state portals and provide illustrative examples of how the states are using web portals to enhance e-service delivery.

E-Service Leaders: Summarizing Five High-Functioning State Web Portals

States leading the way in e-service not only provide online access to a host of services, but also have developed portals that increase the access to these services for all state constituents. California, North Dakota, Maine, North Carolina, and Pennsylvania use their portals to enhance e-service delivery by simultaneously providing customized content and equitable access to government.

Openness

These state web portals distinguish themselves by providing a comprehensive list of e-services. Through the portals, constituents can register cars, file taxes, and obtain professional licenses for a host of occupations including accountant, architect, building contractor, and land survey engineer. Recreation seekers can secure licenses for fishing and camping, and citizens can monitor pending legislation and access many local and federal government agencies. In addition, portal visitors have access to a wide range of state facts and policy information.

Clearly, these states have successfully created one-stop service shops on their web portals. Not only

One-Stop Service Shops

Leading state portals offer a variety of services including:

- Car registration
- Tax filing, form and instruction download
- Professional licensing
- Access to state regulations and pending legislation
- Recreational licensing
- Access to local municipalities, state, and federal agencies

are the services available, but they are also readily accessible—requiring, in some cases, three or fewer clicks to begin the transaction or get the relevant information. For instance, through the California and Pennsylvania portals, visitors are only two clicks away from registering their cars. North Dakota residents can begin their tax filings with one click from the portal. And Maine and North Carolina business owners are only three short clicks away from obtaining information on and submitting proposals in response to state requests for proposals.

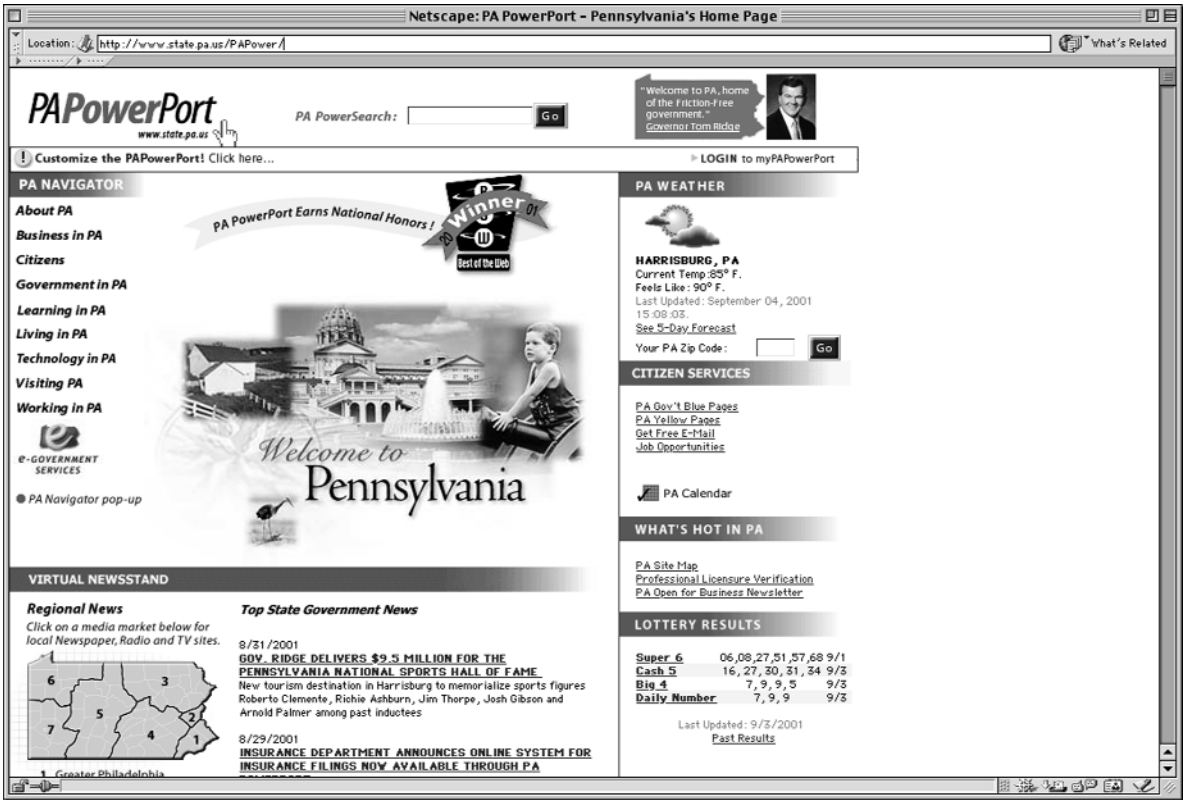
Customization

Only a handful of states have portals that give users the ability to personalize either content or display, and, not surprisingly, the states offering this level of functionality are among the leaders in e-service. North Carolina, Pennsylvania, and California allow the greatest amount of customization. Visitors to these portals can create uniquely tailored views of portal features and content based on personal profiles.

On the California state portal, for example, users are encouraged to create a "My California" homepage that displays news, information, services, and links based on their specified community membership (tourist, resident, student, member of the press, businessperson, or state employee) and preferred online services. Users can choose from a list of online services and information on business practices, consumer and family affairs, education and training resources, environment and natural resources, government agencies, health and welfare agencies, California history and culture, labor and employment, transportation, and travel.

The Pennsylvania portal offers a similar service. Here users can create a "myPAPowerPort" homepage that contains information tailored to their

Figure 3: Pennsylvania, http://www.state.pa.us/PAPower/



Pennsylvania's "PA PowerPort" is one of the top five portals and is distinguished by its level of customizability and advanced navigational features. Visitors to this portal gain access to business, citizen, vehicle, community, and educational services through a layout that enhances the user-friendliness and accessibility of the portal content.

preferences. The Pennsylvania portal also includes the capability for customized content delivery. Users can specify the order in which information should be displayed. Figure 3 (see page 22) shows an excerpt from the Pennsylvania portal. On this page, users can specify both the content and layout for their "myPAPowerPort" homepage.

Usability

E-service leading states are among the most usable web portals. Maine, North Carolina, and North Dakota rank at the top of the usability scale, and California and Pennsylvania provide a good level of assistance to users. One distinguishing feature of these portals is that they are accessible to users across a wide spectrum. At one end of the spectrum, these portals provide extensive help features for users with limited skills and abilities. For example, the North Dakota portal provides online help and searching capabilities as well as new user training. The Maine portal includes step-by-step demonstrations that walk users through the data-entry process for each of the services available online. The North Carolina portal offers help for inexperienced users and it gives non-English-speaking users the option for online translation of portal content. The Maine portal includes an innovative kids section that is designed to help young visitors learn about the state and its services. This page includes four sections: information about the state of Maine, information about the government, games and contests, and other general interest links.

For users at the other end of the spectrum, these leading portals facilitate flexible portal viewing. Many of the portals support advanced technologies. For example, California's portal constituents can gain access to state government information through wireless devices such as PDAs, cellular telephones, and pagers. Additionally, users can opt to receive e-mail notifications of traffic updates, energy alerts, press releases, and lottery results. Some of the portals include advanced navigation features. The Pennsylvania portal, for example, includes a pop-up navigation window that maintains one-click access to the primary online topic areas regardless of the user's clicking history.

Transparency

Without exception these leading portals provide enough information to allow visitors to feel at ease. The portals include basic contact information for agency personnel and for online content, and privacy statements. The online vehicle registration renewal service through the Maine state portal exemplifies how these portals maintain legitimacy with portal visitors. Maine residents completing the online vehicle registration process can access the portal privacy policy and a statement of fair credit card use online. Each page contains a link to the secretary of state's website, which includes contact information for key personnel such as e-mail, mailing address, and phone number. When the registration process is complete, users can print a receipt as proof of their transaction.

Benchmarking Future E-Service Development

Throughout this report we discuss web portals at different stages of development. At one end of the spectrum, e-service leaders such as California and Pennsylvania provide a wealth of services through their portals. Overall, the top states provide online access to services, contact information for key agencies, and well-developed portals that are usable by most of the constituents of the state. At the other end of the spectrum, we find state portals with more limited e-service offerings that are somewhat less accessible than their e-service leading counterparts. We recap the major study findings below.

Portal Functionality

Based on our assessment of the four dimensions of web portal functionality, we find that the five highest functioning state web portals are California, North Dakota, Maine, North Carolina, and Pennsylvania. These portals provide online access to services, include contact information for key agencies, and contain features that enhance usability for most of the constituents of the state. At the other end of the spectrum, New Jersey, South Dakota, West Virginia, Nevada, and Tennessee are more limited in their functionality.

One-Stop Service Shops

Although state web portals provide the promise of a one-stop shop, most states have not yet reached this goal. Even among states offering access to key transactions such as tax filing, car registration, and professional licensing online, most still require constituents to complete the transaction offline. This is particularly true for state portals in the early stages of development. States such as Nevada and South Dakota allow taxpayers to download forms and instructions, but then they must actually mail in their tax payments.

While most state e-government web portals publish information, link to existing websites, and enable users to perform single-agency transactions, some states are providing access to web-based transactions requiring the integration of multiple-agency data. Among these states, one growing trend is to organize services offered through the web portal around events.

For example, what if a citizen moves their residence and needs to update this information with all state agencies that require a current address? Without the integrated web portal, the citizen must first identify relevant agencies and departments to contact, and then complete and submit change of address forms for each. On the other hand, the integrated web portal allows citizens to reduce this cumbersome process to a single step. Because all agencies are linked to a centralized database accessed through the portal, this transaction (change of address) will be simultaneously updated in each agency. Currently, 28 state web portals organize e-government services around events. This is an emerging area of e-government application development; we expect to see more sophisticated examples of multiple-agency integration soon.

Accountability

Remarkably, it is not the lack of online service availability that limits the functionality of early-

stage portals. Rather, usability issues hamper the value of the portals for e-service delivery. For instance, we found that many portals fail to include basic contact information. Surprisingly, many states develop sophisticated web portals with access to a host of information and services, but do not include basic information on whom to contact if the user has questions. If they are truly to enhance service delivery, these portals must convey a certain level of accountability. In other words, users need to believe that the portals are not only a convenient alternative method to access government services, but also that the portals are a fully integrated part of the government service delivery system held to the same standards as any other method. States receiving high ratings in this dimension (openness)—North Dakota, Kansas, Rhode Island, and Kentucky—simply provide telephone numbers, agency office locations, hours of operation, e-mail addresses, and even the names of key agency personnel.

Further, most state portals do little to instill constituent trust. Although privacy and security is a major concern for government portal developers, they do little to indicate this concern to portal users. Only eight states provide both a security and privacy statement on their portal. In addition, most states do not consistently provide receipts or other such acknowledgments of completed transactions. Users want a receipt, proof of the transaction. This is especially true with activities as important as tax payments and license registrations.

Accessibility

States have created their portals to reach the mainstream audience, but must adapt their portals to make them accessible to the wide range of constituents they serve. We found that 16 state portals contain features that do not provide reasonable access to a significant number of disabled users. These portals fail to include alternative image text

Figure 4: North Carolina, http://www.state.nc.us

The North Carolina portal is a leader in both customization and usability. One of only three portals to allow users to create customized views based on personal profiles, the portal also provides a substantial level of help for inexperienced users, and it gives non-English-speaking users the option for online translation of portal content.

that explain images to visually impaired users, and have structural issues that make it difficult for the less literate to read and understand the portal content.

In addition, we found that most state portals do not include the capability for language translation. Most surprisingly, however, we found that many states fail to include basic help features for portal users. The face of the Internet is changing. Constituents going online to access government services come from all demographics. State portal developers can no longer assume a certain level of comfort or knowledge of the technology. As a result, they must make the portals accessible to all constituents.

The Promise of Customized Content

Although the ability to display customized content is one of the key benefits of web portals, most states do not yet provide constituents with the ability to create customized views. Only seven of the 50 states allow portal users to create customized views and of these states, only three—California, North Carolina, and Pennsylvania—provide a high degree of customization. At these state portals, users can identify themselves with specific constituent groups such as students, tourists, or residents of a particular region. In addition, users can register and have their personal information follow them around the portal. This feature increases time savings and user satisfaction.

Conclusions and Recommendations

These findings represent the status of state web portals during a single snapshot in time. Given the ever-increasing demands of the public and the growing technological capabilities of the states, web portals remain in a constant state of development. Regardless of their current state of portal development, the findings presented here should provide some guidance for state officials as they work to deliver the highest level of e-service to their constituents. Accordingly, we make several recommendations to states in the midst of portal development based on the findings of this research.

1. *Emphasize customer service.* The benefit of e-service delivery via a web portal is that it provides more convenient access to state services and information for constituents. To that end, states should include features that facilitate portal use. Features such as help screens, agency contact information, and navigational site maps to help users manage their course through the portal should be readily accessible from every page. Questions, concerns, and problems related to portal content and services are inevitable. However, the goal of portal developers should be to make the answers—or the right person to contact to obtain answers—as easy to find as possible.

2. *Organize services by event rather than department.* Recognize that the average citizen does not understand nor care to figure out the bureaucracy of government. Structuring the portal around events rather than agencies can provide better service to the user. For example, states should list professional license registration on the portal rather than a link to the secretary of state. A citizen who needs to renew his contractor's license will immediately click on "obtain professional license," but may not readily realize which state agency is ultimately responsible for the issue of professional licenses.

3. *Allow for customization.* The value of the portal for e-service delivery lies in its ability to provide easy access to relevant content. Residents want information on tax payments, while students want information on state financial aid policies, and vacationers want information on state parks and recreational permits. Two facts are clear: (1) the set of information and services provided by a state is vast, and (2) what is important to one constituent may be irrelevant to another. Thus, to efficiently present information to portal visitors, states should allow users to personalize both the display and content delivered through the web portal.

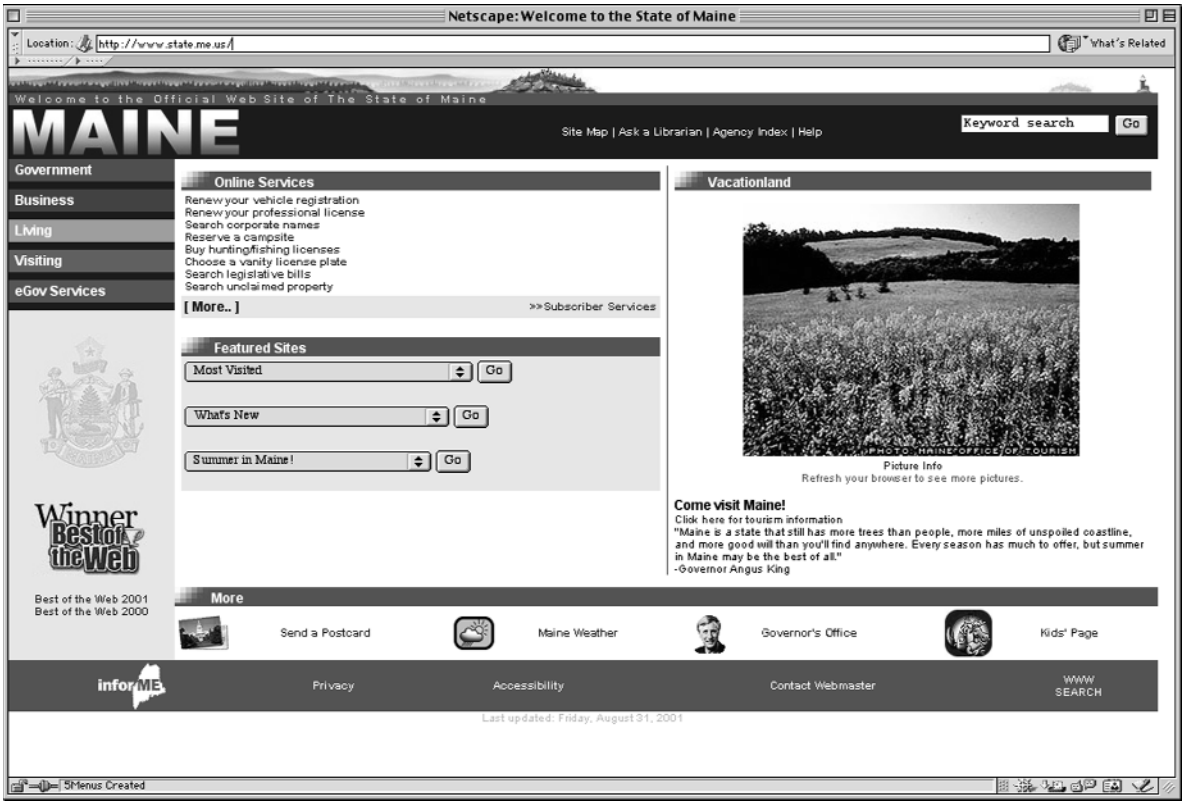
4. *Recognize the diversity of your portal audience.* As the Internet becomes a more widely used tool, states must recognize that the diversity of their portal visitors will continue to increase. Providing good e-service means creating a web portal that is accessible to all constituents of the state. And these constituents include members at both ends of the technological sophistication spectrum. State portals should include help features and demonstrations for novice users, alternative viewing options for users with special needs, and

advanced capabilities for technologically sophisticated users.

5. *Include features that enhance the legitimacy of the portal.* Do not assume that portal visitors will automatically trust the accuracy of portal content or the validity of transactions performed through the portal. Just like the dilemma faced by private sector organizations, state governments must earn the trust of portal visitors. To that end, state portals should include features such as security and privacy statements, content update procedures and dates, contact information for person or office responsible for web portal content, proper acknowledgment of transactions (receipts), and even independent third-party endorsements of the portal.

Designing a web portal to effectively meet the demands of an ever-changing public is no small task. Government agencies are faced with the responsibility of simultaneously providing breadth and depth in their online content, while still maintaining fiscal responsibility. The findings of our research suggest that state e-government initiatives are well on their way to providing comprehensive service online. Our recommendations are designed to build upon the work currently underway in state IT departments. Taken together, these recommendations can help state governments use their web portals to further enhance e-service delivery and exceed the ever-increasing demands of the public.

Figure 5: Maine, http://www.state.me.us



The Maine portal is notable for its high level of transparency. For instance, not only can Maine residents completing the online vehicle registration process access the portal privacy policy, personnel contact information, and a statement of fair credit card use, but they also can print a receipt as proof of their transaction. Although seemingly simple, this is an unusual feature among state portals—available through only eight state portals.

Appendix: State Portal Web Addresses

State Name	Standard Portal Address (URL)	Alternative Address (URL)*
Alabama (AL)	http://www.state.al.us	
Alaska (AK)	http://www.state.ak.us	
Arizona (AZ)	http://www.state.az.us	
Arkansas (AR)	http://www.state.ar.us	
California (CA)	http://www.state.ca.us	http://www.state.ca.us/state/portal/myca_homepage.jsp
Colorado (CO)	http://www.state.co.us	
Connecticut (CT)	http://www.state.ct.us	
Delaware (DE)	http://www.state.de.us	
Florida (FL)	http://www.state.fl.us	
Georgia (GA)	http://www.state.ga.us	
Hawaii (HI)	http://www.state.hi.us	
Idaho (ID)	http://www.state.id.us	
Illinois (IL)	http://www.state.il.us	
Indiana (IN)	http://www.state.in.us	
Iowa (IO)	http://www.state.io.us	
Kansas (KS)	http://www.state.ks.us	http://www.accesskansas.org
Kentucky (KY)	http://www.state.ky.us	http://www.kydirect.net
Louisiana (LA)	http://www.state.la.us	
Maine (ME)	http://www.state.me.us	
Maryland (MD)	http://www.state.md.us	
Massachusetts (MA)	http://www.state.ma.us	
Michigan (MI)	http://www.state.mi.us	
Minnesota (MN)	http://www.state.mn.us	
Mississippi (MS)	http://www.state.ms.us	
Missouri (MO)	http://www.state.mo.us	

** The official web address for each of the 50 U.S. states is www.state.two-letterabbreviation.us, where "two-letter abbreviation" is replaced by the two-letter abbreviation for the state. Some states have established alternative homepage addresses for their web portals. To access these state web portals, users may enter either address.*

State Name	Standard Portal Address (URL)	Alternative Address (URL)*
Montana (MT)	http://www.state.mt.us	http://www.discoveringmontana.com/css1default.asp
Nebraska (NE)	http://www.state.ne.us	
Nevada (NV)	http://www.state.nv.us	http://silver.state.nv.us
New Hampshire (NH)	http://www.state.nh.us	
New Jersey (NJ)	http://www.state.nj.us	
New Mexico (NM)	http://www.state.nm.us	
New York (NY)	http://www.state.ny.us	
North Carolina (NC)	http://www.state.nc.us	http://www.ncgov.com
North Dakota (ND)	http://www.state.nd.us	http://www.discovernd.com
Ohio (OH)	http://www.state.oh.us	
Oklahoma (OK)	http://www.state.ok.us	
Oregon (OR)	http://www.state.or.us	
Pennsylvania (PA)	http://www.state.pa.us	http://www.state.pa.us/PAPower/
Rhode Island (RI)	http://www.state.ri.us	
South Carolina (SC)	http://www.state.sc.us	
South Dakota (SD)	http://www.state.sd.us	http://www.state.sd.us/state/sitelist.cfm
Tennessee (TN)	http://www.state.tn.us	
Texas (TX)	http://www.state.tx.us	http://www.texasonline.state.tx.us
Utah (UT)	http://www.state.ut.us	
Vermont (VT)	http://www.state.vt.us	
Virginia (VA)	http://www.state.va.us	http://www.vipnet.org/portal/services/index.htm
Washington (WA)	http://www.state.wa.us	http://access.wa.gov
West Virginia (WV)	http://www.state.wv.us	
Wisconsin (WI)	http://www.state.wi.us	http://www.wisconsin.gov/state/home
Wyoming (WY)	http://www.state.wy.us	

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Dr. Gant's research examines the extent to which new information and communication technologies (ICTs) influence changes in individual behavior and organizational action. Dr. Gant has presented her work at several national and international conferences, and she has published a variety of articles and book chapters on ICTs and e-commerce. Several granting bodies including Indiana University, the National Science Foundation, Bell Atlantic Mobile Systems, and the Natural Hazards Research Center have funded her work. Dr. Gant has worked and consulted with a wide array of public, private, and nonprofit agencies seeking to inform management and public policy, and to advance public understanding of how these technologies will impact society.

Jon P. Gant is an Assistant Professor of Information Systems and Public Management at the School of Public and Environmental Affairs, Indiana University. Dr. Gant teaches courses on the management of information systems, database management, systems analysis and design, and geographic information systems. He also teaches executive education courses in managing government operations for the U.S. Department of the Navy.

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Dr. Gant's research examines how information technology enables new models of collaboration, and strategies for enhancing the information technology capabilities of organizations. He has worked on research projects funded by The Sloan Foundation, the U.S. Department of Labor, the National Science Foundation (NSF), and the Central Banks of the Caribbean. His work has appeared in a variety of both academic and practitioner journals. Dr. Gant speaks internationally to academic and practitioner-based audiences on information technology, productivity, and public sector service delivery.

He is currently working on research focusing on digital government initiatives in partnership with the Center for Technology in Government at the State University of New York at Albany. This National Science Foundation-funded study investigates new models of collaboration for delivering government services across the United States, Canada, Europe, and Asia. Dr. Gant is also collaborating with the Korean Institute for Public Administration on a study evaluating e-government initiatives by the city government of Seoul, Korea.

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Part II:
Financing and Pricing E-Service

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EXECUTIVE SUMMARY

This report examines the financing and pricing of state government web portals. State governments are developing gateway web portals that have the potential to revolutionize the way government interacts with its citizens and customers. Web portals offer the hope of giving government new ways to deliver information and services, as well as provide new information and services not currently being offered. Web portal technology—and, more broadly, e-government operations—makes it possible for government to operate more efficiently with fewer bureaucratic procedures and with a greater constituent-centric focus. Indeed, web portal technology offers the potential for governments to provide services online, anytime, and from any location.

The new government strategy for the digital age will not be realized until governments enhance their electronic service delivery infrastructure from disjointed websites to integrated web portals providing online communications and transactions. While web portals, when effectively designed, built, launched, operated, and maintained, may help governments provide a higher quality of service and enhance productivity, at this early stage of development many questions remain unanswered. This report addresses two general areas of inquiry by describing and analyzing how state government web portals are financed and online services are priced. Based on our study, we find that:

- States generally do not budget for their web portal projects as capital projects. States should classify and account for portal projects as *capital investments*. Web portals are currently viewed as an operating expenditure in most state budgets rather than a capital expenditure. As a result, most web portals are funded as ordinary office equipment and personnel from current general operating revenues. The operating budget approach makes it difficult for state governments to fully invest in web portal initiatives that have an expected high return in the future, but require substantial up-front funding and long-term cross-agency collaboration. As a consequence, the construction of web portals is underfunded. As a capital investment, the financing and development of web portals should be accounted for in the capital budget. Traditional information technology (IT) budgeting and financial reporting practices are not adequate for portals. The web portal thrusts IT from a back-office operation to a programmatic function, with new budgeting, accounting, and reporting requirements.
- Web portals are long-term investments so states should develop *long-term strategies* for financing them. Effective financing strategies produce a sufficient supply of capital at reasonable cost on an as-needed basis. The financing decision should be similar to any other government capital asset, with the portal financed through some combination of bond proceeds and current revenues ("pay-as-you-go" financing). This financing approach can produce stable, long-term funding for web portals, as it does for other important government capital assets. If public officials choose to unbundle web portal projects into separate plan, build, launch, operate,

and maintenance components, the capital financing approach enables officials to make optimal decisions at each stage of the process over key issues like public/private partnerships, financing, and pricing, without the worries of uncertain funding for future expenditures.

- Only one state reported conducting a benefit-cost study before implementing a portal project. A few states are now starting to systematically evaluate and rank applications prior to bringing them online, but all states should conduct an exhaustive *benefit-cost analysis* that incorporates the portal's expected impact on multiple stakeholders prior to engaging in a web portal project. Moreover, a benefit-cost or cost-effectiveness study should be undertaken when bringing new applications online, since a primary function of the portal infrastructure is to enable governments to bring new applications online that produce administrative savings and enhance constituent satisfaction.
- The term "self-funded" has been applied to the financing of portals developed by a private firm without a major government appropriation. The term implies that the portal is free to the government and those that pay for the government. It is a misnomer. Such portals are vendor-financed portals, and the financing is usually provided for an intermediate term. But regardless of whether the portal is developed by a private firm, a government agency, or both, *the constituents of the government are the ultimate payers*.
- *User charges* are an appropriate form of charging for certain portal services, but charges need not be identical for government-to-citizen (G2C) and government-to-business (G2B) services. Indeed, policy makers may want to explicitly set some G2B prices to cross-subsidize the cost of G2C services that are associated with substantial social benefits. Governments should price online services only after a careful analysis of demand; otherwise, G2B services may be undervalued and underpriced. For services that primarily benefit the direct user, the price charged should equal marginal cost. When social benefits are also generated from providing a service, then aggregate social benefits need to be considered. In cases where benefits can be separated into those enjoyed by direct users and those by society in general, prices should be divided among users (a user charge) and all of society (general revenues). Direct users should cover marginal operating costs, but capital costs that provide societal benefits can be covered with general revenues. Moreover, G2C services that are price elastic and provide substantial social benefits should be priced to stimulate more online transactions and higher adoption rates—the convenience discount providing the best incentive. G2C charging schemes should encourage socially optimal constituent adoption levels. User-charge pricing also makes sense when it can reduce congestion, which requires charging different prices at different times. There is a difference between demand at peak times and off-peak times. This implies that web portal charges should not be fixed, but should vary based on congestion. Higher prices are appropriate at peak times and lower prices, perhaps zero charge, at off-peak times. Internet congestion can result in delays and poor service, reducing the benefit to individuals and society.
- Though the delivery of government online services is still in its infancy, the *revenue-generating potential* from online transactions is significant. Revenue streams from several states appear to be stable and robust, with substantial upside potential as new services demanded by constituents are brought online and private vendor operating costs are brought under control.
- Government officials should not allow *electronic payment processing (EPP) costs* to get in the way of rolling out the portal or bringing new transactions online. EPP costs, while substantial, should be evaluated in terms of the potential savings from lower check-processing costs. Governments should give another look at raising a limited amount of revenue from web portal advertising or sponsorships; such revenue may be able to offset EPP costs.

Introduction

State government web portals are an indispensable component in the sophisticated delivery of electronic services by government: e-government. Ideally, the web portal serves as the face of digital government, the front end of a fully integrated system of databases and business processes that cross government agency lines and levels of government in a seamless fashion. The web portal should be designed emphasizing user-friendliness, convenience, and personal service. As Diana Gant and Jon Gant describe in Part I of this report, web portals should exhibit four characteristics: openness, customizability, usability, and transparency. It will require substantial planning and money for state governments to infuse these characteristics throughout their web portals. Moreover, the movement from simply having a web presence and e-mail communications with the public to a system that provides a broad array of online transactions and actually transforms the way government and constituents interact is a complex, multi-year endeavor that requires substantial resources and an ongoing funding stream.

The construction of a web portal is an expensive undertaking and presents a significant financial and administrative challenge, even for state governments. Because of the expense and technological challenges, many state governments are turning to public/private ventures to construct, host, and operate their web portals. Such arrangements offer promise, but many issues critical to their ultimate success have yet to be resolved. This report addresses issues associated with web portal public/private partnerships and provides suggestions for strengthening such web portal projects.

Based on a survey of state governments, this research describes and analyzes the financing and pricing structures of state government web portals. Between April and July of 2001, the Indiana University research team conducted a telephone survey of state government officials responsible for their state's web portal. The survey asked respondents questions about capital planning and budgeting practices, spending and costs, financing and funding sources, description and pricing structure of online services, citizen adoption rates, and cost savings. The interviews were supplemented with additional information from annual reports, board meeting minutes, strategic e-government reports, and information on web portal sites. Our sample consists of information from 33 states.

The next section discusses the web portal as a capital investment. Then state web portal financing and pricing policies are analyzed, and the final section provides recommendations and concluding remarks.

Is the Web Portal a Capital Investment?

The government web portal infrastructure is a capital asset and should be designed, financed, developed, deployed, and managed as a capital investment. Government capital investments involve spending money on physical assets that are expected to provide benefits over an extended period of time. Often the physical assets provide the basic facilities and installations, the physical infrastructure, of an important governmentally provided service, like water supply and distribution.

Government capital projects are financed, managed, and accounted for in fundamentally different ways from operating activities. Most capital projects have several common elements:

- Substantial expense
- Long-term duration
- Infrequent occurrence
- Limited irreversibility
- Significant, extended impact on the target community

Capital projects are very expensive. The capital investment decision is a long-run production decision. Capital costs are large, up-front fixed costs; they are distinct from operating costs, which are associated with the use of a facility or installation over the short run. A small portion of capital costs may be generated from operating funds, but the bulk of the financing usually comes from long-term financial instruments. Most capital costs, once incurred, are sunk costs invested in project-specific assets. The sunk costs can't be recouped, and the assets, once purchased, have limited, if any, resale value.

Capital projects are long term along three dimensions. First, it takes a long time to bring a project to completion. Capital projects are complex endeavors that typically go through a series of capital planning and budgeting processes, and require an extended project construction period. Major capital projects are not built often and, therefore, the planning that goes into a project is substantial and vitally important. Substantial up-front planning costs must be incurred before construction gets under way. But once construction starts, physical infrastructure projects are difficult and expensive to halt or reverse. Second, the investment is expected to last a long time; capital projects commonly have an expected useful life of dozens of years. In addition, the investment is intended to have a significant effect on the long-term well-being of the organization and target community. Third, capital projects often involve the transfer of resources over time. Capital expenditures usually occur at the beginning of the project, while most project benefits accrue over the intermediate and long term. Because of their futuristic nature, benefits are much more difficult to estimate than up-front accounting costs, particularly tangible and intangible social benefits.

Because of the nature of capital projects described above, capital investment decisions are made with great care. A variety of sophisticated project evaluation techniques are used to systematically evaluate the return on capital investments, such as Benefit-Cost Analysis, Net Present Value Analysis, and Cost-Effectiveness Analysis.[1] Each of these techniques can provide useful information for decision makers, helping them make rational capital investment decisions based on the careful determination and consideration of the costs and benefits to all major stakeholders.

The Web Portal Infrastructure

The web portal infrastructure involves approaching IT development from a new, constituent-service orientation. Rather than simply adding bits and pieces to the present labyrinth of independent information management structures and systems, web portals should be developed with an enterprise-wide structure in mind, creating a unified technological infrastructure that presents a common and easy-to-use interface to the public. The web portal infrastructure consists of an enterprise architecture including user workstations, multiple routers, and load balancers; multiple web, application, and database servers; software applications for security and privacy programs; interfaces with legacy systems and payment systems; and custom applications for personalized technologies, such as messaging, scheduling, and online transactions. In addition, there are the costs involved in implementing networks, integrating databases, and, often, upgrading the telecommunications infrastructure.

Web Portal Developers

Currently, state government web portal projects are typically developed and implemented by either a government agency, such as the Information Technology Department in the state of Iowa, or by private vendors in partnership and/or under contract with a government-sponsored governing board or agency. The governing board or agency is usually vested with the authority to make all policy and contracting decisions. In Virginia, for example, the Virginia Information Providers Network Authority, VIPNet, is responsible for the development and expansion of Virginia's portal.[2] VIPNet is a legal authority with an 11-member board of directors and approximately 20 full-time employees. VIPNet is responsible for setting portal policies, overseeing

operations, and approving all online services and charges. VIPNet contracts portal services from Virginia Interactive, a subsidiary of National Information Consortium, Inc. (NIC).

Table 1 provides information on the distribution of government agency and private vendor developers. State officials report that 11 (33 percent) of their web portals are agency developed, 14 (43 percent) are vendor developed, and 8 (24 percent) are jointly developed by government and the private sector. The state of New Jersey's web portal provides an example of an agency-developed web portal. New Jersey's Office of Information Technology (OIT) provides a wide range of web-based services and products for its "customers"[3]—New Jersey's departments and agencies—including application development, web-enabling legacy applications, and data integration and warehouse solutions. According to OIT, they have developed and currently maintain 90 percent of the applications used throughout state government. In most states, agencies must fund, build, and maintain their own applications.

An example of joint portal development is provided by California. California hired approximately 15 different vendors to work on various pieces of the portal. While Deloitte Consulting was the project manager responsible for integrating all of the portal pieces, a government official stressed that California's Office of eGovernment maintained oversight of the design of the portal throughout the project. The government official emphasized that they specifically did not want long-term contracts with any vendor to develop the whole portal, and that they contracted out each piece in short-term contracts, helping them to retain full control over the portal.

Table 1: Distribution of State Web Portal Developers N=33

	Number	Percentage (%)
Government Agency	11	33
Private Firm	14	43
Joint—Government & Private Firm	8	24

Web Portal Development

Agency Developer: Government agency acts as prime contractor and builds and operates portal internally.

Vendor Developer: Government contracts out portal development and operations to private sector firm(s).

Joint Government/Vendor Development: Government works in concert with private firm(s) to design, build, and operate portal. Often a government agency will be the prime contractor and be solely responsible for overall project design and implementation. The agency works with multiple vendors to build the portal, and individual vendors are subcontracted for building, and possibly operating, particular aspects of the portal, but are not contracted to build and operate the entire portal.

Many governments contract with a private firm to develop their portal. NIC is the most frequent private contractor, representing 63 percent of state government portal contracts.[4] This figure is for general portal contracts. It should be noted that some firms are pursuing a strategy of bidding for specialized (unbundled) applications, such as State Department of Motor Vehicle Services or payment engines, rather than a general portal contract.

Table 2 provides information on spending for 16 enterprise portal projects.[5] State governments report spending an average of $2 million on enterprise portals, from a low of $303,250 to a high of $6,500,000. These figures should be considered low estimates because they do not include private vendor software development costs, which can be substantial. For example, NIC estimated their software development costs at $3.5 million for their subsidiary, Indiana Interactive. If software development costs were included for states with a private portal developer, the average cost would be higher.

A few additional caveats regarding portal spending figures are in order. Many states surveyed could not separate portal from other e-government spending,

Table 2: Web Portal Spending Costs
N=16

Average Cost	Standard Deviation	Minimum	Maximum
$2,055,000	$1,828,000	$303,250	$6,500,000

so their figures are not included. States that expended funds for very limited website purposes, not a potentially enterprise-wide portal, are also not included. Our intention is to present an accurate picture of spending for comprehensive, enterprise web portal projects. In addition, many governments, or their vendors, would not release portal spending information, stating that it is proprietary, and some states reported that they did not keep track of aggregate portal costs.

Planning and Budgeting for Web Portal Projects

Over 85 percent of web portal projects, like most traditional IT budgets, are currently funded as operating expenditures in the annual operating budget with little centralized tracking of expenditures. IT agencies often use a charge-back system to bill agencies for multiple IT services, and only a few states report itemizing and separately tracking and reporting web portal expenditures. States that have established a budgetary line item for annual web portal expenditures report an average annual budget of $730,000.

It is not uncommon for expenditures to be commingled across different activities, functions, and agencies in government operating budgets. In capital budgets, in contrast, expenditures are accounted for separately for each project, which enables the government to better manage spending on particular projects over time. No state in our sample explicitly funds all portal expenditures from a capital projects fund. A few states use the capital projects fund to account for most expensive IT hardware purchases. Two states, Georgia and Washington, have established enterprise funds for portal spending. Using an enterprise fund approach is an important step forward because it acknowledges that portal spending will be ongoing and that funded projects should be self-sustaining.

Enterprise funds are used to account for activities for which a fee is charged to users to cover service-related costs, including capital costs such as depreciation and debt service.[6] Fees or charges of activities accounted for in enterprise funds should include depreciation expenses, and are commonly levied at a rate to cover debt service costs, as well as operations and maintenance. Therefore, portal fees and charges accounted for in enterprise funds should be derived from real costs.

Since web portal projects are rarely accounted for in the capital budget, they usually do not go through a capital planning process where their return on investment is calculated and directly compared to other potential investment projects. Only one state reported conducting a benefit-cost or return-on-investment analysis *prior* to investing in a web portal project. The annual (incremental) operating budget approach makes it difficult for state govern-

National Information Consortium (NIC)

NIC was formed in 1997 to combine under common ownership individual companies operating in the states of Kansas, Indiana, Nebraska, and Arkansas, and the National Information Consortium USA, Inc. NIC has become a national leader in the provision of Internet-based, electronic government services. NIC's services include the development and management of official government web sites (portal outsourcing); document management, filing, and ethics and elections reporting systems; and web-based supply chain and e-purchasing services. Portal revenues accounted for 66 percent of total NIC revenues in 2000.

Source: National Information Consortium 2000 Annual Report.

ments to fully invest in web portal initiatives that have an expected high return in the future, but require substantial up-front funding and long-term, cross-agency collaboration. Government officials are often hesitant to highlight expected savings for fear of having the savings cut from their base budget. Budgeting systems should provide incentives for administrators to make cost-saving portal investments. Officials should be allowed to reinvest the savings into expanding the portal infrastructure, especially for portal services that are demanded by constituents and provide significant social benefits.

Indicative of the lack of long-term planning, only a few states have developed procedures for projecting future portal spending. This lack of long-term planning is disconcerting for two reasons. First, one of the main benefits of the portal is that new applications can continuously be fitted to the portal infrastructure, adding more value to the initial investment. A web portal is a dynamic, not a static, investment; it is designed to be able to grow to provide new and improved content and services. Therefore, future costs, beyond mere maintenance costs, and future benefits are integral aspects of any web portal investment.

Second, many portals in operation today are really enhanced pilot projects, and are not yet fully scaled portals providing multiple online communications and transaction services linked to back-end legacy systems.[7] Many states have chosen to launch "something" very quickly, adding infrastructure improvements and applications piecemeal overtime, rather than plan and construct a full-scale portal initially. Such portals are built with the foreknowledge that future development costs will be substantial and recurring. Despite these planning shortcomings, a clear advantage from contracting with an established private vendor is the rapid speed with which they are able to bring a basic, scalable, portal architecture online. Moreover, unbundling segments of the portal infrastructure and applications into separate contracts makes economic sense provided it is implemented within an overall strategic plan and vision of what the final product will look like. The vast majority of portals were reported to be up and running within one year. Some private vendor projects were completed even sooner; North Carolina's @Your Service portal was reportedly completed in six weeks.[8]

Enterprise Funds and Internal Service Funds

While enterprise funds and internal service funds are both classified as proprietary funds (fiscal and accounting entities used to account for governmental activities that are operated as quasi-businesses), they differ in their focus. Traditionally, most IT activities have been accounted for in internal service funds, recognizing the traditional role of the IT unit as a service provider within government. Internal service funds are used to report activities where an agency provides goods or services to other funds, departments, or agencies of the government on a cost-reimbursement basis.

With the advent of web portals and online transactions, a new orientation toward enterprise fund accounting is appropriate and reflects the new external, programmatic orientation of many IT activities. Enterprise funds are used to report activities for which a fee is charged to external users for goods or services. According to the Governmental Accounting Standards Board, activities are required to be reported as enterprise funds if:

1) debt is secured by a pledge of net revenues from fees and charges of the activity;

2) the cost of providing services, including capital costs such as depreciation or debt service, are to be recovered with fees and charges, rather than with taxes or similar revenues;

3) pricing policies establish fees and charges to recover costs, including capital costs.

Source: Governmental Accounting Standards Board, Statement No. 34 of the Governmental Accounting Standards Board: Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments, (June 1999).

How State Governments Finance Web Portal Projects

Most websites were initially financed and developed from internal government resources, often using the labor of motivated employees. This was sufficient when the web was primarily used to display information on government offices and officials. But now that the web can be effectively used for collaborative commerce (i.e., transacting business, delivering services, facilitating communications and interaction between citizens and government, and between levels and types of governments), the *traditional* financing and development strategies are no longer robust enough to produce a sufficient amount of capital on a timely and regular basis. Therefore, new financing strategies for web portal projects should be adopted.

State governments employ two basic financing approaches: 1) government financed; and 2) private vendor-financed (the so-called self-funding model). The notion that portals developed by private firms—without any major appropriations from the state government—are "self-funded" is a misnomer. In such a case, the private firm simply puts capital up front in the expectation of receiving cash flows from the portal. The vendor makes a business decision that the discounted value of expected future net cash flows from portal operations will be greater than the up-front investment. Those future cash flows, however, come from citizens and firms. Private vendors attempt to recoup their investment by generating revenue from two basic sources: 1) charging users for the "convenience" of transacting business over the web rather than through traditional channels such as over-the-counter and mail-in; and 2) charging businesses for "enhancing" the value of basic government information. These two added-value approaches form the primary funding streams behind the *Internet-based model*.

Despite the long expected useful life of the web portal infrastructure, most state governments do not use a long-term financing strategy. Most portal contracts are from three to five years, indicating that vendors are willing to supply state governments a form of intermediate-term finance. Bond proceeds were used in only one state, and only two states report using a special technology fund. As implemented, these special technology funds set aside funds for portal projects, but they are not revolving funds.[9] Revolving funds are set up to recycle funds in order to make the fund self-sustaining. The revenues from current and seasoned projects flow back into the system to provide money for new projects. State revolving funds have proven successful at financing major physical infrastructure programs, but even the most successful revolving funds received public start-up funding in the form of federal grants and matching state government debt proceeds.

The charge-back system used to support many IT budgets does not provide, by itself, a sufficient and sustainable amount of revenue to implement full-scale portal development in a comprehensive fashion. However, a financing strategy that couples an enterprise-based charge-back system with some form of intermediate or long-term financing from state government bonds may be effective. A bond financing program can generate a large, flexible pool of funds for multiple capital investment projects over an extended period of time. Such an *infrastructure-financing model* has proven successful at financing a wide variety of major capital improvements and can be an effective and efficient

financing mechanism to support the next wave of web portal development, along with other e-government investments. An enterprise-based charge-back system, with charges established at rates based on the marginal cost of service provision, can provide an incremental revenue stream to support debt service (or lease rental) payments.

Taxes, Fees, or Charges?

Ultimately, all state government web portals are paid for by some combination of general revenues (mostly taxes), user fees, or user charges from constituents doing business with the state. According to Mikesell,[10] user fees involve the sale of licenses by government to engage in otherwise restricted or forbidden activities. User charges, in contrast, are prices charged for voluntarily purchased services. While user-charge based services may benefit specific individuals or businesses, they are provided to fulfill basic governmental responsibilities.

The distinction between fees and charges is important for online services provided by government, since most government services currently provided online are also provided, for a fee, through traditional mechanisms. For example, the cost to renew a vehicle registration is a user fee. The vehicle registration is a necessary condition for operating the vehicle simply because the government requires a payment for granting people the privilege of driving a car. The additional charge for the option of renewing a vehicle registration online is a user charge, provided there are alternative ways of renewing the registration. A critical element of a user charge is that it's voluntary, implying that consumers are not legally required to purchase the service, or, if they are, that there are alternative providers. Therefore, most so-called convenience fees are user charges.

User charges have several benefits. First, they enable government to make the people who benefit from the service pay for the service; conversely, people who do not benefit do not have to pay. This improves equity because non-users are not forced to subsidize users. Secondly, they help officials gauge constituent preferences and estimate demand for a service. This can enhance operational efficiency and improve internal resource allocation decisions because services need only be provided for users at the level they demand. In addition, user charges make more economic sense when demand is price elastic, implying user demand is price sensitive. The more price elastic demand, the greater the potential for inefficiency if users do not face true costs.

User charges, however, may not be appropriate when the services intentionally subsidize low-income or otherwise disadvantaged households, or when the services provided generate substantial social benefits. User charges are commonly set based on both the benefit derived from usage and the cost of service provision. The basic rule for efficient economic pricing requires marginal benefit to equal marginal cost. For services that primarily benefit the direct user, the price charged should equal marginal cost. When social benefits are also generated from providing a service, then aggregate social benefits need to be considered. In cases where benefits can be separated into those enjoyed by direct users and those by society in general, prices should be divided among users (a user charge) and all of society (general revenues).

Indeed, user charges make more economic sense when direct users enjoy most of the benefits. User charges should be based on marginal benefits, not total benefits. For example, it may be argued that as more people become comfortable with using web portals, and more services are put online, the benefits from individual online usage will spill over to all of society by reducing the digital divide and making government more constituent-centric. In such a case, direct user charges should be based only on their marginal benefit, not the entire social benefit. Direct users should cover marginal operating costs, but capital costs that provide societal benefits can be covered with general revenues.

User-charge pricing also makes sense when it can reduce congestion, which may require charging different prices at different times. There should be a difference between demand at peak times and off-peak times. This implies that web portal charges should not be fixed, but should vary based on congestion. Higher prices are appropriate at peak times, and lower prices—perhaps zero charge—at off-peak times. Internet resources, such as bandwidth, are limited; once the service becomes crowded, additional users impose congestion costs on other users. Therefore, another role of the user charge can be to reduce overcrowding during peak hours, which should increase constituent satisfaction and overall usage.

Web Portal Funding and Financing Models: Traditional, Infrastructure-Finance, and Internet-Based

TRADITIONAL MODEL	**FUNDING STREAMS—General revenues:** monies appropriated from the general fund. **Charge-back pricing:** internal assessments that allocate costs to individual agencies or departments for centralized and distributed operations and services. **FINANCING MECHANISMS—None**.
INFRASTRUCTURE-FINANCE MODEL	**FUNDING STREAM—Debt proceeds:** funds generated from the sale of state or local government notes or bonds. **FINANCING MECHANISMS—Debt securities:** state governments sell short-term notes and long-term bonds in the municipal securities market to raise money to pay for capital improvement projects. There are three basic types of debt securities: general obligation, revenue, and lease rental. *General obligation (GO) bonds* are full faith and credit debt secured by the general taxing power of the issuing government. GO bond debt service is repaid from general governmental revenues. *Revenue bonds* are sold to finance projects that are intended to be "self-sustaining"; that is, they are expected to generate enough revenue through user charges and other non-tax sources to meet debt service payments and cover operations and maintenance activities. *Lease rental securities* are supported by leasing contracts that include an annual appropriation requirement that is structured to cover rental payments. Lease rental securities, sometimes also referred to as certificates of participation (COP), are often sold by general service agencies to finance intermediate-term equipment purchases. **Revolving funds:** funding programs that recycle loanable funds to finance successive generations of projects over an extended period of time. Using dedicated capital from various sources including grants, asset sales, borrowing, and equity contributions, revolving fund managers employ portfolio management techniques to lend funds to projects at low or zero cost, and recycle the incoming funds into future lending or granting activities. Leveraging is commonly used to expand the resources available to the fund. Leveraging involves using fund assets to provide additional security for debt repayment, enabling the fund to generate financing that is a multiple (e.g., 4-to-1) of fund assets.
INTERNET-BASED MODEL	**FUNDING STREAMS—Advertising:** revenue generated from the sale of advertising space, or "sponsorships," on web portal pages. **Portal Access and Transaction-Based Revenue:** *subscription fees* are fixed, up-front charges for access to additional (premium) services. Typically, the subscription fee is an annual fee that is coupled with a variable charge for services such as information searches and report printouts or downloads. *User fees:* revenue from the sale of licenses by government to engage in otherwise restricted activities. A hunting license fee, for example, that is levied by the government as a condition for the individual to exercise the "privilege" of hunting. *User charges:* prices charged for voluntarily purchased services. Prices levied for online service transactions are convenience charges. User charges are established on an exchange market model where a good or service is traded for funds. Individual consumers or firms can be identified and charged for the good or service, and non-payers can be excluded from consumption. **FINANCING MECHANISM—Vendor Finance:** intermediate-term financing where private vendors pay for start-up costs, commonly using internal funds or equity proceeds, and intend to recoup their investment through online transaction charges and subscription fees.

The Structure of Portal Revenue and Prices

The amount of web portal revenue produced from online services is a function of price and quantity. Revenue is generated from the delivery of services over the Internet such as renewing motor vehicle registrations online. Price is the charge for purchasing government services online, and quantity is the number of online transactions. Obviously, the higher the prices charged and the greater the number of online transactions, the greater the revenue. Equally obvious, governments *should not* charge citizens or businesses a price that maximizes portal revenue—it is the business of government to provide services with a social demand at a price that covers a portion, if not all, of the costs of provision. But it is not governments' business to maximize revenue. Moreover, governments should not charge a price that reduces demand below socially optimal levels, especially for G2C services. High prices for online services may increase revenue, but at the cost of fewer transactions and lower adoption rates. Such a policy is not socially optimal if web portal services provide substantial social benefits.

The special nature of information provision makes this especially important. State government web portal pricing policies and practices should be consistent with sound information pricing principles. The cost structure of an information technology supplier generally involves high fixed costs and very low marginal costs. Therefore, producers, especially private vendors, have an incentive to create a virtual monopoly, limiting competition and controlling supply.

One way suppliers attempt to limit competition is to control the flow of information. Information on revenues generated by web portals is very limited because most web portals have only recently begun to bring services online, and current public disclosure and reporting practices need improvement. Most states do not record and report portal revenues centrally. More states should consider establishing the web portal, or the governing board, as an accounting entity for financial reporting and public disclosure purposes. In cases where officials believe this to be overly burdensome, they should nevertheless do so to enhance the public's trust of their

Indiana Interactive, Inc.

Indiana Interactive, Inc., was created in 1995 to develop, operate, maintain, and expand an electronic government portal for the Access Indiana Information Network, a State of Indiana government instrumentality created by the Indiana General Assembly for the purpose of providing access to state, county, and local information for Indiana citizens and businesses. Indiana Interactive, Inc., is responsible for funding up-front investment and ongoing operating costs, and managing and marketing the portal.

Source: Indiana Interactive, Inc., and subsidiary, Consolidated Financial Statements for the Years Ended December 31, 1999 and 1998.

e-government efforts. While many states that contract with private vendors were very forthcoming with information, including audited financial reports and contracts, some states responded that the information was proprietary, indicating that some states need to implement procedures for publicly disclosing web portal finances and other activities. Even when the portal is operated under contract by a private firm, its activities and finances should be disclosed to the public in a full and timely manner, just like other governmental activities.

Despite the limitations mentioned above, our inquiry indicates that state government web portals have substantial revenue-generation potential. One important aspect of a revenue structure is its ability to produce a stable revenue stream. Indiana is widely acknowledged to have established one of the first portals with a broad array of online transactions. Table 3 shows Indiana Interactive, Inc.'s financials from 1996 to 1999.

The data show steadily increasing revenues from $11.65 million in 1996 to $14.57 million in 1999. Gross profit increased sharply between 1996 and 1998, dipping slightly in 1999. But net income has decreased sharply since 1997, because of increasing operating expenses. The "cost of revenues" fluctuated between 76 percent and 82.5 percent of revenues, indicating that prices for online services remained steady over this period. The cost of revenues in web portal accounting terminology refers primarily to the contractual amount of fees remitted to government agencies from online transactions. Another example of the revenue potential of web portal services is provided by Virginia, which realized a gross profit of $3.9 million in 2000, based on $21 million in revenues. The revenue figures from the early deployment of online services and transactions in Indiana and Virginia indicate that the portal and its applications have substantial revenue potential.[11]

Portal revenue is a function of online transaction volume (not merely hits, accesses, sessions, or any other measure that does not involve an exchange of funds for a service or product); the more online transactions, the more revenue generated. While aggregate data on transactions is currently scant, early data from Texas is illustrative of the transaction volume potential. In the first quarter of 2001, Texas collected $8,062,159 on 11,632 payment transactions, which were mostly generated from a few agencies with applications that went live in July 2000.

What Online Services Are Provided?

States now provide a variety of online services to citizens (G2C) and businesses (G2B). These new developments involve both opening up new distribution channels for traditional services, and the

Table 3: Indiana Interactive, Inc., Financials

	1996	1997	1998	1999
Revenues	$11,658,194	$12,524,065	$13,850,258	$14,574,808
Cost of Revenues	$9,623,884	$10,040,041	$10,601,849	$11,402,941
Gross Profit	$2,034,310	$2,484,024	$3,248,409	$3,171,867
Operating Expenses	$1,309,734	$1,671,922	$2,862,963	$2,880,120
Operating Income	$724,576	$812,102	$385,446	$291,474
Net Income	$711,223	$803,777	$279,411	$118,435

Source: Indiana Interactive, Inc., and subsidiary, Consolidated Financial Statements for the Years Ended December 31, 1995, 1996, 1997, 1998, and 1999.

creation of new information-related services. The services offered to businesses and those offered to citizens should be viewed as distinct services with different demand and other relevant characteristics. Business organizations have a better technological infrastructure, and business users have more technological knowledge than the average citizen. In addition, businesses have a demand for different services, and probably a greater ability and willingness to pay for services that are comparable to G2C services in terms of production costs. As a result, different pricing structures are appropriate for G2B and G2C commerce.

The most frequently reported G2C online services involve motor vehicle agencies—vehicle registration renewal, specialty plates, and driver's license renewal. Many states enable citizens to obtain other licenses online for hunting and fishing, real estate, and other professional occupations. Other frequently provided online services include state park reservations and personal income-tax filing.

States report providing many G2B added value services for authorized businesses involving searching records and generating reports for driver's records, vehicle titles, liens, and registrations; business certificates of existence, entity name, and principals. Other business services include Uniform Commercial Code (UCC) filings and searches, tax payments, business registration and renewal, and license verification. Most states offering added value business services have designed a two-part pricing structure, charging firms a fixed annual "premium service" subscription fee of $50 plus a per search or report fee. States now appear to be modestly increasing the premium subscription fee: Tennessee now charges $75, and Montana is proposing to charge $75. Despite the increase, G2B services may still be underpriced, both in terms of recovering the full cost of provision and their marginal benefit to businesses. For example, for the $50 annual subscription fee *accessIndiana* provides businesses with 10 accounts covering 21 services, including monthly billing and online account management services. A rigorous demand analysis would likely find that a $50 or $75 annual premium service fixed fee plus a small variable cost per search or record substantially undervalues the premium service, given:

1. the substantial fixed and variable costs incurred to design and build the portal infrastructure;
2. annual operations and maintenance costs, including the non-trivial cost of providing monthly billing and online account management services; and
3. the likelihood that businesses have an inelastic demand for most premium services, such as motor vehicle and title lien searches.

State governments, not just their private vendors, need to rigorously analyze the demand for current and prospective G2B services. A two-part pricing structure lends itself to fixed and variable cost recovery, where the fixed charge is set to cover fixed (capital) costs, and the variable charge is set to cover operating costs. States should also distinguish between mandated versus non-mandated services. Services that are demanded by private firms but are not mandated by the state should be priced based on firms' willingness to pay, and revenues generated above costs can be used to subsidize portal activities that provide substantial social benefits. On the other hand, services that are mandated by the state, like vehicle registration renewals, should not be priced above the cost of provision.

The Pricing Structure of Online Services

When private vendors operate the state portal, G2C and G2B service charges are under the authority of a governing board. In practice, the vendor proposes a fee structure that the governing board usually approves without making substantive changes. In states where portals are run by the government agency, it is not clear that there is an economic basis used to derive portal charges. States report that their charges are not based on a formal break-even analysis or similar methodology. In most cases the convenience fee is established like other fees in the budgetary process, where the agency through the executive branch recommends a fee structure and the legislature enacts it into law, sometimes with modification.

Most states, around 80 percent, impose some type of charge for online services. The total charge for

online services (TOC) includes the statutory fee for service provision through traditional channels. It may also include a convenience fee (CF)—a usage-based charge imposed on citizens to use the system—or a convenience discount (CD), where the cost to the public is lower for services transacted online. Only two states in our sample, 8 percent, use convenience discounts. States appear reluctant to use CDs despite anecdotal evidence that demand is price elastic. In Arizona, for example, adoption rates skyrocketed for online vehicle registration renewals once the $6.95 charge was eliminated in 1998.[12] For online services with an elastic demand, sharp CD programs may translate into substantial administrative savings if properly planned and implemented.

Over half of the states charge a convenience fee (CF), which is placed on top of the fee for services delivered through a traditional venue. Since customers still have the option of using the service through a traditional venue (e.g., over the counter), the CF is actually a user charge and is referred to herein as a convenience charge (CC). In most states, the portal charge consists of the convenience charge (CC), or convenience discount (CD), and the electronic payment processing (EPP) fee.[13]

Electronic Payment Processing (EPP) Fees

Some states that impose an additional cost for using online services do not impose a CC, but they do pass along the EPP fee. Often electronic payment processing fees frequently constitute the largest part of the price of doing business online, and are clearly viewed by policy makers as an impediment to the growth of online service delivery. However, officials should not view electronic payment processing costs in isolation; rather they should be compared to check-processing costs. A recent study reports that, per transaction, check-based payment is more costly than electronic payment for payees receiving point-of-sale and bill payments, $1.25 to $0.23.[14]

States report three basic ways credit card processing charges are structured for online services: 1) as a single rate percentage of the transaction; 2) as a percentage range; and 3) as a single rate percentage of the transaction plus a fixed transaction fee. For single percentage rates, credit card processing charges per transaction range from 1.50 percent to 2.28 percent; ranges vary from 1.7–3.5 percent to 2.5–4 percent per transaction; and single percentage plus fixed fees vary from 1.614 percent + $0.24 to 2.35 percent + $0.10 per transaction. Generally, these figures are substantially higher than the CCs states are charging.

In many states the credit card processing fee paid to the merchant bank is not transparent, because it's folded into the transaction fee. However, in other states, the EPP fee is clearly designated as a separate charge. Some states have comprehensive agreements with merchant banks, but commonly the state will negotiate a separate agreement for online services, and private vendors have negotiated agreements on behalf of the government in a few states.

In some states, around 20 percent of our sample, the government cannot, or does not, impose an additional charge, so the agency must absorb the cost of online transactions, whether the service is provided in-house or by a vendor. Arizona vehicle registration renewals provide a case in point. Arizona contracts with IBM for their vehicle registration renewal portal operations. But the state is prohibited from levying an additional portal charge on citizens for vehicle registrations and licenses. The charge for each vehicle registration renewal that IBM processes over the web has three components: a $1.00 fixed charge, plus 2 percent of the vehicle tax (or $4, whichever is greater), plus up to 1.7 percent of total transaction costs for merchant (EPP) fees. Arizona reimburses IBM up to 1.7 percent of total transaction costs for merchant (EPP) fees. IBM gets to keep $1.00, plus 2 percent of the vehicle tax (or $4, whichever amount is larger). Therefore, IBM is guaranteed a minimum of $5 per transaction and an indeterminate maximum amount, but the maximum could be substantially higher since Arizona uses an ad valorem system, not a fixed registration fee, to determine the vehicle registration renewal fee, and uses $363 as a typical registration amount on their website. For specialty plates, Arizona levies a $4 portal charge on top of the $25 fee, and the entire $4 goes to IBM. The agency is, however, responsible for absorbing up to 1.7 percent of the EPP fee.

Advertising as a Revenue Source

State government officials have put thumbs down on the advertising revenue model. Only 12.5 percent of state government portals offer any form of advertising, and even these states do not use advertising to generate revenue. Iowa recently contracted with govAds to sell web advertising, referred to as "sponsorships," on its portal. Iowa's strategy of selling advertising comes as a direct response to the 50 percent budget cut in its e-government initiatives by the Iowa General Assembly. According to Iowa officials, the state retains the right to remove advertisements and incurs no up-front expense. govAds is responsible for setting up the advertising operation and receives revenue through a negotiated split in revenues from the advertisements. Iowa provides a test case of the appropriateness of advertising on state government web portals, as well as advertising's ability to generate a sufficient and stable revenue stream.

State governments probably can't generate substantial revenue from advertising, even when they want to. But they may be able to generate enough revenue from benign advertising, like the tourism advertising links on the Minnesota web portal, to largely offset EPP and other costs. State officials should follow Iowa's lead and re-evaluate the revenue potential of benign, non-controversial advertising. Clearly, there are a myriad of issues that states will have to work through in order to establish a viable advertising revenue model, but such impediments can be surmounted. States should assertively tackle the obstacles because it will only increase their ability to expand the benefits of e-government to their constituents. In addition, many citizens may view advertising more favorably than state government officials believe. In Texas, for example, almost 75 percent of state residents reportedly view advertising as either an entirely or somewhat acceptable e-government funding method.[15]

Recommendations

The web portal has the potential to change how government is organized and how it interacts with its constituents. But in order to move forward effectively, IT professionals must work together with budgeting and finance experts to find solutions to financial and management problems associated with the development and operation of web portals and online transactions. Government officials and private vendors should build upon the best traditional ways of funding portals by incorporating proven techniques from infrastructure finance coupled with unique Internet-based funding mechanisms.

While the empirical data is not yet sufficiently developed to provide solid evidence on complex public policy issues like the efficacy and cost efficiency of portal vendor development and financing, it is clear that government officials and private firms should view the ultimate end users of the portal as customers with a demand for new services and improved service delivery. These new and improved services must be designed based on the needs and capacities of users, not merely traditional organizational structures and inter- and intra-governmental relationships. They must be priced in a way that maximizes social, not just private, benefits, which in many cases should lead to charging no price at all. The changes described in this report, if implemented, will go a long way toward alleviating the underfunding problem in web portal development, while simultaneously maximizing adoption and usage. Specifically, we recommend that decision makers consider the following:

Recommendation 1

Web portal projects are capital projects and should be classified and accounted for as such. Web portal expenditures should be viewed as a capital investment, classified as capital expenditures, accounted for in the capital budget, and reported distinctively and comprehensively in budgetary and financial reports.

Recommendation 2

Web portals are long-term capital investments and should be financed like other long-term capital investments. Web portal projects should be supported with long-term financing that is repaid from multiple funding sources. User charges are appropriate but should not be relied on to finance capital costs for services generating significant social benefits. The capital financing approach produces stable and substantial longer-term funding, and facilitates an optimal portal and online transactions development process.

Recommendation 3

Governments should conduct studies that analyze the benefits and costs of developing web portals and applications for online transactions.[16] Such rigorous studies should be used to guide portal and application development decisions, particularly in terms of estimating potential cost savings, social benefits to stakeholders, and the demand for particular online services. Before setting user charges for G2B services, governments should estimate the

demand for G2B services since such services may significantly reduce a firm's cost of business. And before imposing user charges for G2C services, governments should understand the potential intermediate and longer-term cost savings from the strategic use of convenience discounts.

Recommendation 4

Within G2B online services, states should distinguish between mandated versus non-mandated services. G2B services that are demanded by private firms but are *not* mandated by the state should be priced based on firms' willingness to pay. Revenues generated above costs can be used to subsidize portal activities that provide substantial social benefits. On the other hand, G2B services that are mandated by the state, like vehicle registration renewals, should not be priced above the cost of provision.

Recommendation 5

Government officials should not allow electronic payment processing costs to prevent the establishment of new online transaction services. EPP costs, while substantial, should be evaluated in terms of the potential savings from lower check-processing costs. Governments should re-evaluate the option of raising a limited amount of revenue from benign, non-controversial web portal advertising or sponsorships, which may help offset EPP costs.

Recommendation 6

More states should consider establishing the web portal or the governing board as an accounting entity for financial reporting and public disclosure purposes. States should record and report portal revenues centrally, preferably in an enterprise-type fund. In cases where officials believe central tracking and reporting to be overly burdensome, they should nevertheless do so to enhance the public's trust of their e-government efforts. Even when the portal is operated under contract by a private firm, its activities and finances should be disclosed to the public in a full and timely manner, and in a manner that enables the public to track and evaluate the operations of the portal and the delivery of online services.

Recommendation 7

Government budgeting systems, including charge-back systems, should provide incentives for administrators to make cost-saving portal investments. Budgeting systems should enable programmatic savings generated from web portal investments to be enjoyed by line agencies. Administrators should be encouraged to reinvest the savings into expanding the portal infrastructure, especially for portal services that are demanded by constituents and that provide significant social benefits. In addition, charge-back systems should be based on real costs, and savings from portal investments should be credited to IT units when appropriate.

Appendix: More on the Pricing of Online Services and the Impact on Agency Budgets

The basic pricing structure for online services can be illustrated with the following equation:

Total Online Service Charge (TOC) = Statutory Fee (SF) + Convenience Charge (CC) – Convenience Discount (CD) + Electronic Payment Professing Fee (EPP)

(Eq. 1)

The total charge for online services (TOC) includes the statutory fee for service provision through traditional channels. When imposed, the convenience fee is placed on top of the fee for services delivered through a traditional venue. Since customers still have the option of using the service through a traditional venue (e.g., over the counter), the convenience fee is actually a user charge—a usage-based charge imposed on citizens to use the system—and is referred to here as a convenience charge (CC). TOC can also include a convenience discount (CD), where the cost to the public is lower for services transacted online. Some states that impose an additional cost for using online services do not impose a convenience charge but pass along the EPP fee. In most states, the portal charge (PC) is an additional charge, where:

Portal Charge (PC) = CC (– CD) + EPP

(Eq. 2)

An example of a PC is provided by electrical contractor license renewals in Idaho. The statutory electrical bureau fee (SF) is $100 for obtaining a license renewal on site. The portal charge (PC) for online service is $5. Therefore, the total charge for an online (TOC) license renewal is $105. The $5 portal charge has two components: 1) the Access Idaho transaction fee of $2.35, plus the EPP fee of $2.65. The EPP fee is paid to a merchant bank for processing credit card payments. Notice that the EPP fee is larger than the Access Idaho transaction fee. This is not uncommon, especially for higher TOCs, since the merchant bank fee is commonly a percentage of the transaction.

Table A.1 provides an example of online service delivery transactions from the government agency's perspective. Table A.1 presents agency revenue (AR) as a function of several variables already discussed—SF, CC, CD, EPP—and a new variable PV, the amount of the charge allocated to the private vendor. It illustrates the revenue impact on the agency for three basic scenarios: 1) the agency receives new net revenue; 2) the agency receives no new revenue, but incurs no new costs; 3) the agency receives no new revenue and incurs new costs.

In the online service new revenue scenario, the agency receives $2.35 in new revenue per online transaction (line 1) because the agency imposes a CC greater than the EPP fee. (Note that the agency receives $100 for delivering the service on site.) In this case the agency is responsible for the development and operation of the portal, not a private vendor. The CC, however, is non-trivial. While covering the EPP fee and providing additional revenue for new investment, it may create a disincentive for constituents to use the online system.

In the second scenario (lines 2a and 2b), the agency receives no new revenue, but incurs no additional costs. The agency imposes a CC sufficient to cover the EPP fee (line 2a), and does not contract with a private vendor. This has the advantage of a lower portal charge and helps to expand in-house IT capacity. When contracting with a vendor, the agency can charge a CC equal to the EPP fee plus vendor's fee (line 2b). This has the benefit of a quick launch, but the portal charge to the constituent is greater.

In the third scenario, the agency loses revenue directly from the online transaction. In line 3a, the loss is due to the EPP fee; in line 3b it is due to both the EPP fee and the private vendor fee. While ostensibly an entirely negative result for the agency, this situation may provide agencies with a strong incentive to realize the commonly "hypothesized" savings from bringing transactions online. Moreover, it enables the agency to bring applications online quickly, maximizes constituent adoption, and may increase social benefits.

No scenario presented in Table A.1 has a CD, which would reduce agency revenue directly, at least initially, but would likely increase usage quickly and broadly. States that provide CDs have the agency absorb the cost. If substantial cost savings result from moving services online, then these initial costs should be viewed as an investment in future savings.

Table A.1: An Illustration of the Impact of an Online Service Delivery Transaction on an Agency Budget

Agency Revenue (AR) = Statutory Fee (SF) + Convenience Charge (CC) – Convenience Discount (CD) – Electronic Payment Processing Fee (EPP) – Portal Vendor Fee (PV)

1.	New Revenue	AR	=	SF	+	CC	–	CD	–	EPP	–	PV
		$102.35	=	$100	+	$5	–	$0	–	$2.65	–	$0
2a.	No New Revenue, but Agency Breaks Even (no vendor)	AR	=	SF	+	CC	–	CD	–	EPP	–	PV
		$100	=	$100	+	$2.65	–	$0	–	$2.65	–	$0
2b.	No New Revenue, but Agency Breaks Even (with vendor)	AR	=	SF	+	CC	–	CD	–	EPP	–	PV
		$100	=	$100	+	$5	–	$0	–	$2.65	–	$2.35
3a.	Net Revenue Loss (no vendor)	AR	=	SF	+	CC	–	CD	–	EPP	–	PV
		$97.35	=	$100	+	$0	–	$0	–	$2.65	–	$0
3b.	Net Revenue Loss (with vendor)	AR	=	SF	+	CC	–	CD	–	EPP	–	PV
		$95.00	=	$100	+	$0	–	$0	–	$2.65	–	$2.35

Endnotes

1. Dr. David Audretsch, Dr. Jon P. Gant, and Dr. Craig L. Johnson, *A Return on Investment Framework for Evaluating E-Government.* (Bloomington: Indiana University School of Public and Environmental Affairs, 2001).

2. See *Virginia Information Providers Network Authority Annual Report 2000*.

3. The term "customer" is the official language used by the OIT to describe its services rendered to state government organizations. See *http://www.state.nj.us/oit/services_do.html*, accessed July 26, 2001.

4. The following private vendors are listed as a percent of vendor-developed portals found in our sample: National Information Consortium, Inc. (63 percent), Accenture (16 percent), IBM (11 percent), KPMG (5 percent), Perpetual Plus Technology (5 percent).

5. The states are Arizona, California, Delaware, Indiana, Massachusetts, Michigan, Missouri, Montana, Nebraska, New Mexico, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Carolina, and Texas.

6. See Governmental Accounting Standards Board, Statement No. 34 of the Governmental Accounting Standards Board: *Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments,* (June 1999).

7. Pilot projects are basically controlled experiments or development projects. They can demonstrate the feasibility of a larger, full-scale project, and should be designed for scalability and full integration. In addition, a pilot project should include evaluation procedures that include user feedback, and raise and answer major operational support questions.

8. See Report for the General Assembly, *E-Government: Using Technology to Transform North Carolina's Governmental Services and Operations in a Digital Age*. (Information Resource Management Commission, February 2001).

9. For a description of the successful state clean water and safe drinking water revolving fund programs, see: United States Environmental Protection Agency, *SRF Fund Management Handbook,* (Office of Water, April 2001). For an analysis of the necessary financing components of revolving fund programs, see: Craig L. Johnson, "Managing Financial Resources to Meet Environmental Infrastructure Needs: The Case of State Revolving Funds," *Public Productivity and Management Review*, (Spring 1995, Vol. 18, No. 3).

10. John Mikesell, *Fiscal Administration: Analysis and Applications for the Public Sector,* (fifth edition, 1999).

11. Similarly, Nebraska Interactive generated positive net income in both 1998 and 1999. (Nebraska Interactive, Inc., Financial Statements for the Years Ended December 31, 1999 and 1998).

12. Ellen Perlman, "No Free Lunch Online," *Congressional Quarterly*, *Inc*. (2000).

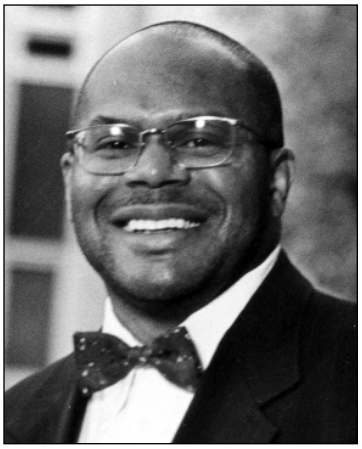
13. See Appendix for more discussion on the pricing of online services and the impact on agency budgets.

14. See Kirstin E. Wells, "Are Checks Overused?" Federal Reserve Bank of Minneapolis, *Quarterly Review*, (Vol. 20, No. 4, Fall 1996); and David Humphrey, et. al., *Cost Recovery and Pricing of Payment Services*. (Policy Research Working Paper, 1833, The World Bank, October 1997).

15. See Texas @nline Electronic Government Task Force, *Texas Online: A Feasibility Report on Electronic Government* (November 1, 2000).

16. For a discussion of the importance of conducting an assessment of the costs and benefits of providing web-based government services, see Steven Cohen and William Eimicke, "The Use of the Internet in Government Service Delivery," chapter 2 in *E-Government 2001,* edited by Mark A. Abramson and Grady E. Means (Rowman & Littlefield Publishers, Inc., 2001).

ABOUT THE AUTHOR



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

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

About PricewaterhouseCoopers

The Management Consulting Services practice of PricewaterhouseCoopers helps clients maximize their business performance by integrating strategic change, performance improvement and technology solutions. Through a worldwide network of skills and resources, consultants manage complex projects with global capabilities and local knowledge, from strategy through implementation. PricewaterhouseCoopers (www.pwcglobal.com) is the world's largest professional services organization. Drawing on the knowledge and skills of more than 150,000 people in 150 countries, we help our clients solve complex business problems and measurably enhance their ability to build value, manage risk and improve performance in an Internet-enabled world. PricewaterhouseCoopers refers to the member firms of the worldwide PricewaterhouseCoopers organization.

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