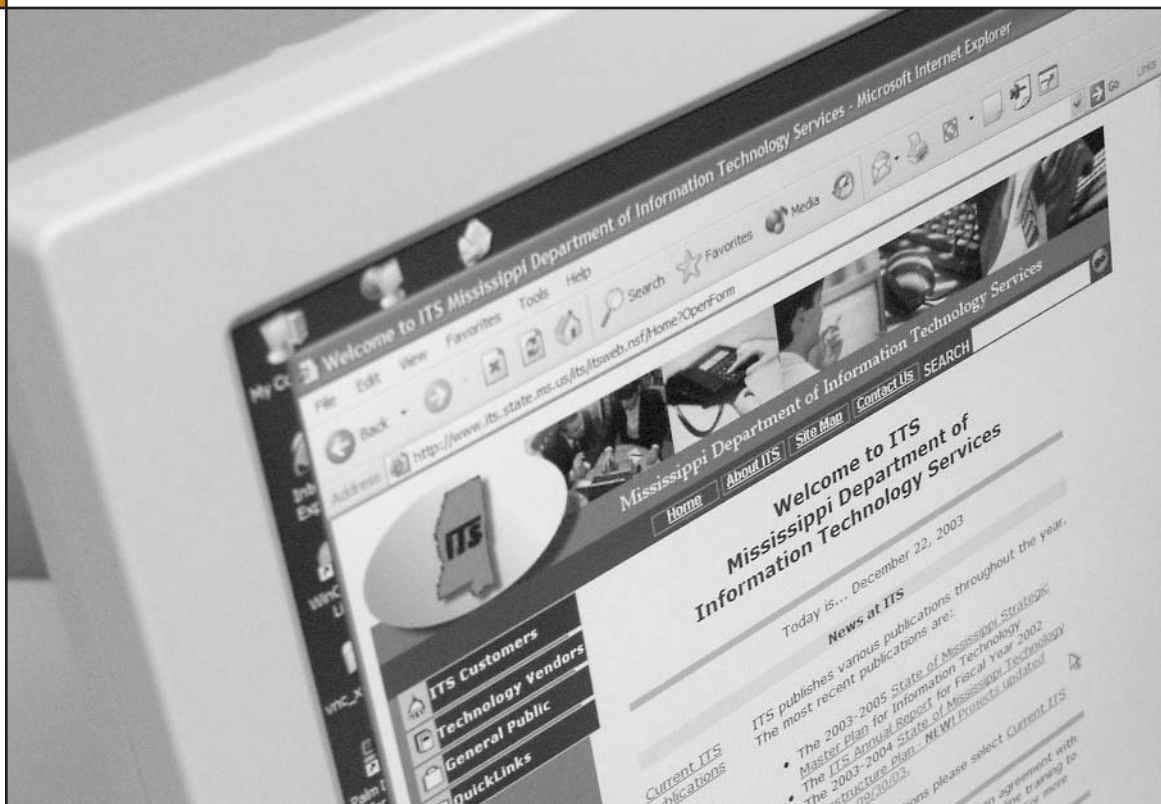


Measuring the Performance of E-Government



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E - G O V E R N M E N T S E R I E S

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F O R E W O R D

March 2004

On behalf of the IBM Center for The Business of Government, we are pleased to present this report “Measuring the Performance of E-Government,” by Dr. Genie N. L. Stowers.

In this report, Dr. Stowers examines the ways the federal government and several states measure e-government performance. Simply “going online” does not end of the work of government managers responsible for public sector websites. In addition, government managers must build websites that meet the needs of users both inside and outside government. The challenge facing public sector executives is how to make government easier, quicker, cheaper, more effective, and more responsive. To meet this challenge, it becomes increasingly important for government to define measures of success and regularly monitor and measure performance.

According to Dr. Stowers, few jurisdictions today are actively using performance measures to assess the impact of their e-government efforts. She selects two states—Mississippi and Virginia—from among 17 using e-government performance measures to identify best practices. She also documents how federal agencies, as well as the states of Texas and Minnesota, are developing performance measurement data, including customer satisfaction measures.

Based on her research, and mirroring performance measures used for more traditional public programs, Dr. Stowers lists the kinds of input, output, and outcome measures that can be used to measure the performance of e-government. She concludes with 11 recommendations to help governments develop their own performance measurement efforts. We trust that this report will be informative and useful to government executives across the nation eager to assess the impact of their investment in e-government.

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EXECUTIVE SUMMARY

This report focuses on performance measurement of e-government efforts by federal, state, and local governments in the United States. The next important steps in the development of e-government are to determine what services are being provided and how effectively. Given the amount of time and money being spent today on e-government, the public sector needs to ensure accountability by spending more time in measuring the effects of these efforts—and to take seriously the need for doing so. We all need to understand both the benefits and the costs of putting resources into these efforts.

In focusing upon performance measurement, this report also presents some data on the results of e-government in several jurisdictions. It appears that the public sector is holding its own in this application of technology to service delivery.

This report presents research on the numbers of jurisdictions that appear to be actively engaged in using e-government performance measures and highlights several jurisdictions that represent best practices in the field based on the quality of their current efforts. These jurisdictions illustrate best practices in two areas: 1) in the development of performance measures themselves (Mississippi and Virginia) and 2) in the collection of performance measurement data (U.S. government agencies, Texas, and Minnesota).

Through its very comprehensive performance measurement system, Virginia has incorporated e-

government performance measures into its management process. The system itself is well-documented and can be viewed, along with past performance data, on the state's website. In addition, Mississippi has developed some useful performance measures as part of its strategic planning process, illustrating how the two can work together.

Through the American Customer Satisfaction Index (ACSI), federal agencies have been able to take advantage of the measurement of customer satisfaction with agency websites. Through ACSI, agencies can use an established methodology that allows comparisons across agencies and to companies within the private sector.

Texas uses a broad array of performance measurement data in order to be able to justify its e-government efforts, which are completely self-funded. In addition to using surveys to gather data about citizen satisfaction, they gather and analyze data on the cost-benefit balance of e-government efforts, adoption rates of online licensure applications, and other performance measures. Minnesota, through its Department of Administration, conducts citizen satisfaction surveys for its NorthStar State portal.

The report concludes with a series of recommendations aimed at jurisdictions interested in developing their own performance measurement system. E-government has come far in just a few years, and measuring just how far is the next stage of that development.

Performance Measurement Today

This report examines the ways in which public sector jurisdictions are measuring the performance of their e-government efforts, as well as how they are measuring these efforts. The ultimate goal of this research is to identify outstanding examples of performance measures and performance measurement efforts in e-government so that others can learn from these experiences. Performance measurement is important to e-government efforts so that governments can track what is working and what is not and assure citizens that government's time and funds are being well spent.

Public sector performance measures are typically quantitative ways of determining the resources that go into providing services (input measures), the immediate results of those services (output measures), and the longer-term results of providing those services (outcome measures). Performance measurement can be defined as "measurement on a regular basis of the results (outcomes) and efficiency of services or programs."¹ There is a great deal of emphasis on performance measures today as a way of providing accountability and the means to a results-oriented management strategy. Performance measurement began in the 1930s as part of systems analysis and has grown in importance in recent years as part of the overall emphasis on accountability and government achievements.

Ideally, performance measurement is tied into an organization's strategic planning process as a way of measuring the implementation of goals and objectives derived from an organization's mission

and strategic value statements and SWOT (strength, weaknesses, opportunities, and threats) analysis. It can also be implemented directly as part of the budgeting process in performance budgets and sometimes is implemented by itself.

Types of performance measures for traditional public sector services include the following:

- **Inputs**, or the resources used to produce services
- **Outputs**, or the products and services actually produced
- **Activity or process measures**, which measure the activities used to produce outputs
- **Efficiency and productivity measures** (unit-cost ratios)
- **Service quality measures**
- **Outcomes**, (intermediate and end), which are the desired results of providing the service

Often, inputs, outputs, and outcomes alone are developed to constitute a full performance measurement system.

As an example, performance measures for a human services shelter program might include budget, staff hours, and volunteer time as inputs into the shelter; the number of classes taught and individuals housed as outputs; the number of persons in classes per unit of staff cost as an efficiency measure; and new knowledge or increased skills and improved ability to maintain employment, as the

ultimate outcomes of the shelter and other services provided. Activity or process measures (also output measures) for a shelter might include the number of counseling sessions held, while service quality measures (also output or outcome measures) could include client satisfaction with services, and efficiency measures might include unit cost per number of persons housed.²

To be effective, performance measures should be tangible, specific, numeric measures; they usually begin with the words, “number of...,” “percent of...,” “ratio of...,” “incidence of ...,” “proportion of...” or similar words.³ Ideally, they should also indicate the time period being measured. An effective measure in the area of e-government, therefore, might be “percent of nurses using the online license renewal application during FY 2002-2003” rather than “service should be reliable.” Multiple measures are more useful than single measures, although the advantages must be balanced against the creation of an overly cumbersome and burdensome system. Measures also need to be selected with the help of stakeholder input and support so that they can be effectively implemented.⁴

Other criteria for selecting outcome indicators include the following, from Hatry:

- **Relevance to the mission/objectives** of the program and to the outcome the indicator is intended to help measure.
- **Importance to the outcome** it is intended to help measure. Does the indicator measure an important aspect of the outcome?
- **User comprehension** of what is measured and reported.
- **Program influence or control over the outcome.** ...As long as the program is expected to have some tangible, measurable effect on a specific outcome, an indicator of that outcome should be a candidate for inclusion—whether the effects are direct or only indirect.
- **Feasibility** of collecting reasonably valid data on the indicator.
- **Cost of collecting the indicator data.** This is another criterion to be used with caution. Sometimes the most costly indicators are the most valuable.

- **Uniqueness.** To the extent that an indicator is duplicated by, or overlaps with, other indicators, it becomes less important.
- **Manipulability.** Do not select indicators that program personnel can easily manipulate to their advantage.
- **Comprehensiveness.** The set of indicators should include outcomes that identify possible negative or detrimental effects. ...Does the list of indicators cover all the quality characteristics of concern to customers, such as service timeliness? Does the list of indicators include relevant feedback from customers of the program relating to the outcomes?⁵

Additionally, criteria should be:

- Focused on one issue to ensure that measurement is accurate and reliable
- Specific to the issue at hand
- Balanced and fair
- Acceptable⁶ to all involved so there is support for the system and resistance is reduced

Well-designed performance measures must also be fitted together into comprehensive performance measurement systems comprised of measures for multiple services. Together, these systems should be:

- **Outcome-focused.** Measures should focus on the ultimate mission of the organization and remain so focused.
- **Simple and resonant at the top.** Make the system simple so that efforts can be focused in a minimum of directions.
- **Challenging, but realistic.** Allow agencies to stretch but don't make accomplishments impossible.
- **“Cascading down” and “folding back up.”** At each level of the organization, individuals should be contributing to overall goals that affect all levels and that contribute to the accomplishments of the overall organization.
- **Broadly used.** Don't include performance measures just at reporting times; fully incorporate them into regular meetings and activities.

- **Visible.** Results and the measures themselves should be available and visible, not just the purview of those in management or in the budgeting area.
- **Interactive and informational.** Work to include everyone in developing the system and use the performance measures as an organizational learning tool.
- **Frequent and fresh.** Up-to-date, detailed data let you detect performance problems.
- **Segmentable.** Being able to break down information into individual categories can be quite useful to understanding events and trends within your jurisdiction. If possible, collect and structure enough data to ensure that you can do that.
- **Fact-based.** Ensure that data are collected accurately and provide realistic views of the organization's performance.⁷

The history of traditional performance measures is a long one. These criteria characteristics and the way that the measurement process has been implemented in the past have much to teach today's information technology specialists working in the area of e-government.

Once measures have been identified and methods to collect the data developed, the performance measurement process can continue. When measures are kept on a regular basis, they can then be used to monitor performance and drive necessary program changes.

To ensure that the performance measurement process achieves its full potential, results should be presented in a readily understandable and accessible manner. Results should also be presented on a regular basis with performance data and accompanied by narrative about the reliability and validity of the data as well as how the data was gathered. To increase accessibility, measures can be presented graphically and accompanied by narrative descriptions.⁸

Benchmarking is a related aspect of performance measurement that ensures that a jurisdiction begins its performance measurement efforts with some baseline comparison—to other jurisdictions, to previous years, to accepted professional standards, or to projected targets. This data is typically presented in graphic or tabular form, comparing one jurisdiction's performance with that of the appropriate comparison group.

Types of E-Government Performance Measures

Performance measures have been widely used for traditional government services. Clearly, e-government is vastly different in its delivery modes, its 24/7/365 delivery expectations, and its ease of use. Some traditional performance measures are appropriate for e-government, but in general, new measures were developed to provide accountability for jurisdictions' e-government efforts. However, little effort has been expended so far in developing these measures or encouraging governmental agencies to work on them. McClure, Sprehe, and Eschenfelder developed some initial draft measures in a contract for the federal government⁹ and the author of this report developed additional measures¹⁰ for possible use by agencies. However, the topic of e-government performance measurement is still woefully underemphasized, as illustrated by the mere three paragraphs dedicated to the topic in the joint National Information Consortium and Public Technology, Inc. report on e-government strategic planning.¹¹

Many e-government performance measures mirror those in traditional public service. "E-Government Input, Output, and Outcome Measures" (see page 11) lists the kinds of input, output, intermediate and end outcomes, and other performance measures that could be used to measure performance in e-government. "E-Government Activity, Service Quality, and Efficiency Measures" (see page 12) provides definitions and examples of other types of output and outcome measures—activity, service quality, and efficiency measures. Although this listing is not exhaustive, it does include many of the possible performance measures that could be used by jurisdictions implementing e-government.

Methodology for Measuring E-Government Performance

E-government methodologies use data collected through surveys and web monitoring software and administrative data from records. The methodologies themselves include traditional random telephone surveys, web-based pop-up surveys or page-based clickable "opt-in" web surveys, cost-benefit analyses, the basic gathering of performance or benchmarking data, and the e-government specific web tracking methodologies.

Surveys are typically used to measure customer satisfaction and opinion. One type of survey used in this area is the traditional random sample survey conducted via telephone. Traditional random sample surveys have the benefit of being a well-tested methodology—one that is easily understandable to many. However, given the rates of e-government participation at this point, random samples of the general population run the risk of not including adequate numbers of individuals who have had experience with the specific e-government applications.

In the field of e-government, website pop-up surveys can also be used. Pop-up surveys are those short, web-based sets of questions that are programmed to appear for randomly selected users (selected to ensure a specific proportion of users receive the survey). One case highlighted later in this report shows the results of pop-up surveys and a methodology developed by University of Michigan researchers. The federal government then

E-Government Input, Output, and Outcome Measures

Input measures should cover the resources put into e-government efforts, including the following:

- Application development and hardware set-up
 - Staff costs
 - Development costs
 - Vendor costs
 - Staff time for application development
 - Development time
 - Vendor time for development purposes
- Maintenance and application improvement
 - Staff costs
 - Maintenance costs
 - Vendor costs
 - Staff time
 - Improvement time
 - Vendor time

Output measures are those immediate actions resulting from e-government efforts, including the following:

- Number of hits or user contact sessions
- Number of document downloads
- Amount of time users spend on a site
- Number of transactions completed, or the times online forms have been accessed and completed
- Dollar amounts processed through each site
- Time required for e-mail response to inquiry
- Number of e-mail messages sent to agency and/or officials
- Number of e-mail requests successfully resolved
- Number of applications developed and implemented
- Number of e-permits processed
- Number of times various maps and mapping applications have been accessed
- Number of e-commerce applications accessed
- Number of licenses and other applications processed
- Number of times multimedia presentations are played
- Amount of feedback on multimedia presentations

- Number of times databases are accessed
- Frequency of which information in databases is accessed

Intermediate outcomes are outcomes that are expected to lead to a desired end, but which are not ends in and of themselves.¹² They can include the following:

- Accessibility of services
 - Number of pages on a site that meet accessibility criteria
- Accuracy of the assistance or information provided as measured by percent accuracy rates in random fact checking
- Adequacy of information as measured by staff and citizen surveys
- Adoption rates within specified user groups
- Time required for e-mail response to inquiry
- Ease of use as measured by pop-up or other surveys
- Effectiveness as measured by pop-up or other surveys
- Level of citizen satisfaction with e-government services as measured by pop-up or other surveys
- Number of referrals from other websites and government portals
- Response time to requests for information
- Usefulness
 - Level of citizen satisfaction as measured by pop-up or other surveys
 - Number of referrals from other websites and government portals
- For states and local governments, the number of agencies participating by providing information or services

End, or ultimate, outcomes are the consequences of the program or those “end results that are sought.”¹³ They can include the following:

- Cost savings from e-government
- Staff time savings from e-government
- Trust in government by citizens as measured by surveys

Sources: Stowers, Genie N. L. 2003. *Issues in E-Commerce, E-Procurement, and E-Government Service Delivery*. In Garson, David (Ed.) *Digital Government: Principles and Best Practices* Hershey, Pennsylvania: Idea Group; McClure, Charles R.; Sprehe, J. Timothy, and Kristen Eschenfelder. 2000. *Performance Measures for Federal Agency Websites*. Defense Technical Information Center and Energy Information Administration. U.S. Government Printing Office; Hatry, Harry P. 1999. *Performance Measurement: Getting Results*. Washington, D.C.: Urban Institute Press.

E-Government Activity, Service Quality, and Efficiency Measures

Activity measures are those that measure activities themselves rather than the results of those activities. Activity measures are also types of output measures. Examples might include the following:

- Number of commission meetings streamed to citizens
- Number of online chat sessions between elected officials and citizens

Service quality measures are measures of quality in delivering services; they can also be considered intermediate outcomes.

- Accessibility of services
 - Number of pages on a site meet accessibility criteria
- Accuracy of the assistance or information as measured by percent accuracy rates in random fact checking
- Adequacy of information as measured by staff and citizen surveys
- Amount of time needed for email response back to inquiry
- Ease of use as measured by pop-up or other surveys
- Effectiveness as measured by pop-up or other surveys
- Minimal webpage errors
- Percent of time when website is down and not available
- Timeliness
 - Response times to requests for information

Efficiency, “or unit-cost ratio,” is “the relationship between the amount of input and the amount of output or outcome of an activity or program.”¹⁴ Efficiency measures are also considered output or outcome measures.

- Cost of providing each service per user
- Cost per transaction
- Total cost per user session

Sources: Stowers, Genie N. L. 2003. Issues in E-Commerce, E-Procurement, and E-Government Service Delivery. In Carson, David (Ed.) Digital Government: Principles and Best Practices. Hershey, Pennsylvania: Idea Group; McClure, Charles R.; Sprehe, J. Timothy, and Kristen Eschenfelder. 2000. Performance Measures for Federal Agency Websites. Defense Technical Information Center and Energy Information Administration. U.S. Government Printing Office; Hatry, Harry P. 1999. Performance Measurement: Getting Results. Washington, D.C.: Urban Institute Press.

uses the results in its efforts to measure customer satisfaction with government websites. Studies by these researchers indicate that they are as effective as traditional random sample surveys; have greater response rates than clickable, “opt-in” surveys on the websites being visited; and have fewer response biases built in. These efforts will be reported on later in this report as a best practice.

Clickable, “opt-in” surveys are those that are available on the website at the end of an application, should the user choose to follow the link and respond to the survey. Surveys using this methodology run the risk of low response rates; pop-up surveys have higher response rates and lower response bias.

Cost-benefit analysis is used to measure the relative costs and benefits of many programs and applications, and e-government is no exception. E-government service delivery applications are relatively new and government service providers and researchers can learn much from traditional cost-benefit analyses. Like surveys, this methodology will only measure one aspect of performance—the relative comparison of costs to benefits, or cost-effectiveness. However, this is an important aspect, one that has a high priority for many jurisdictions. The methodology involves tracking and separating out the costs for each individual application, then estimating who benefits from that application and how much that benefit is worth. An important application of this technology, by the State of Texas in its TexasOnline portal, will be discussed in depth later in this report.

Collecting performance data to track performance measures is another important way to measure how well e-government is accomplishing its goals. Of course, e-government performance measures include aspects of traditional performance measurement such as customer satisfaction and cost-effectiveness. But they can also include many other different aspects, including the number of visits to a website, the number of users participating in a service, or the adoption rates for professionals renewing their professional licenses. The methodologies are typically straightforward data collection involving databases, spreadsheets, or even accounting software packages.

Web tracking methodologies are also used to track web/technology performance measures in e-government. Typically, these software tools monitor web traffic patterns, site visitor behavior, and site performance data. By analyzing the so-called “clickstream” data—data left by web users—visitor log files, and server data, the following kinds of individual-level data can be assessed:

- Number of visitors that see a particular page
- Percent of visitors who click on a particular link
- Where visitors click next
- Time required to load pages (slow page delivery)
- Number of repeat visitors
- Number of unique visitors
- Average time spent on any one page
- Exit rate, or how fast users move off site

Unfortunately from the point of view of collecting this kind of detailed data about user visits, many governmental agencies are constrained from doing so by privacy policies that prevent the use of “cookies”; they are therefore able to use only their own server data, which prevents the identification of individual level data. However, server-level data would still provide information about time on site, error rates, or time to load pages.

Jurisdictions can use any or all of these methodologies as need dictates in monitoring their performance information. Once data is collected, it can be used in several ways. It can be used to calculate cost per unit of service or other productivity measures; to compare budgeted/planned performance to actual performance; to compare to performance during other periods; or to compare to agency or established standards, if they exist.¹⁵

Data comparisons should be used to track performance over time and thereby identify areas needing improvement. Ultimately, the goal is improved services. In this way, performance measurement becomes the hallmark of a constantly learning and improving organization, responsive to citizens and businesses, and always working toward providing excellent and innovative services.

Today's E-Government Performance Measures

Unfortunately, few jurisdictions today are actively using performance measures to assess the impact of their e-government efforts. More jurisdictions have identified measures they would like to see used, but fewer appear to have begun the actual data collection. This section presents data on state and local jurisdictions that have strategic plans and performance measures. Since performance measures are typically developed within strategic plans or the budgeting system, the research in this report was conducted by identifying and then examining strategic plans, annual reports, and performance data for information about jurisdictions' performance measures and performance data. Details about the research methodology can be found in the Appendix.

Frequency of E-Government Performance Measures

Figure 1 presents data on the number of states with strategic plans and performance measures.¹⁶ One-third (33 percent) of states plus the District of Columbia have both strategic plans and identifiable performance measures. No performance measures could be found for a striking 67 percent of all states, although 71 percent of all states did have a strategic plan. No states had performance measures without a strategic plan, also a telling figure.

At the federal level, there is much more consistency in the development of performance measures, due to the influence of the U.S. Office of Management and Budget. OMB's E-Government Task Force presented a strategy for the development

of e-government efforts at the federal level. This process culminated in a group of 23 initiatives developed by federal agencies and selected as official e-government efforts by the President's Management Council. These projects include several cross-cutting websites like GovBenefits.gov and Recreation One-Stop, services like IRS Free Filing and Online Access for Student Loans, and data presentations like Consolidated Health Informatics. For each of these projects, performance metrics were developed. These can be seen in the E-Government Strategy document created as a result of this initiative.¹⁷ These performance measures will be presented in the next section of this report.

Figure 1: States' Strategic Plans and Performance Measures

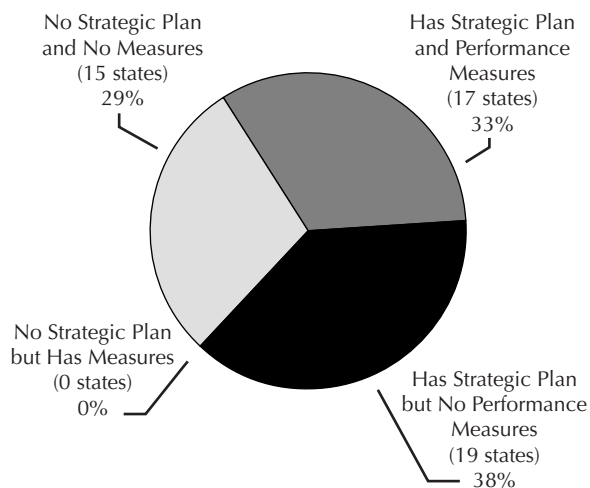
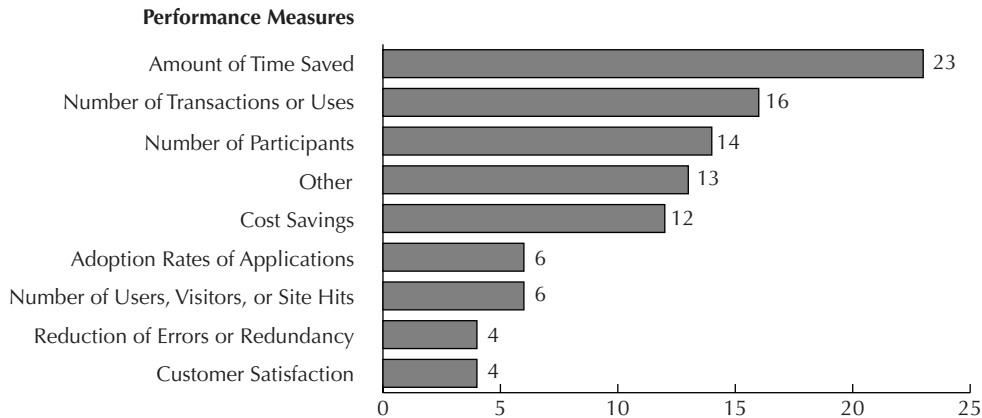


Figure 2: Frequency of Use—Federal E-Government Performance Measures



Types of Performance Measures Found

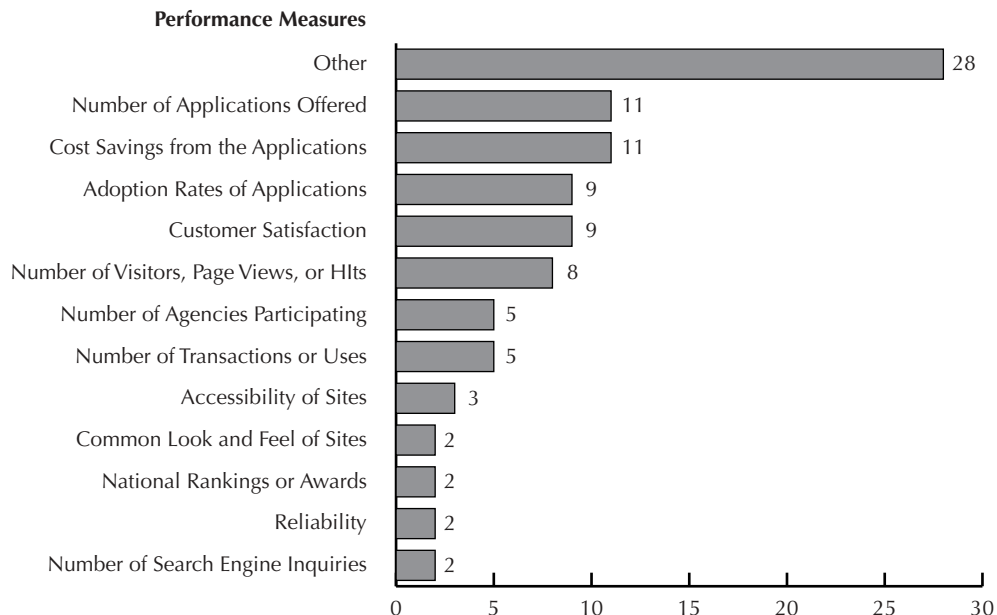
Figure 2 identifies how frequently various performance measures were developed to measure the effectiveness of these federal efforts. “Amount of Time Saved” was used 23 times across the 23 initiatives, by far the most commonly found measure. This was followed by “Number of Transactions or Uses” (16 times) and then, “Number of Participants” (14 times). “Cost Savings” was also a common measure, appearing 12 times. “Adoption Rates” and “Number of Users, Visitors, or Site Hits” also were observed, but far less often. Least common were “Reduction in Errors or Redundancy” and “Customer Satisfaction” (4 times each).

Table 1 presents the all-important “Other” category, which comprises those measures observed only once among the 23 different federal initiatives. This information provides a view of the wide range of performance measures utilized by various agencies, many of which are geared to very specific services.

Figure 3 (see page 16) presents trends in the performance measures developed by state governments and large cities. Clearly, there is a wide variety of measures and services being measured, as the “Other” category is by far the largest (28 instances found). Following “Other” are “Number of Applications Offered” and “Cost Savings from the Applications” (both with 11 uses). Next are “Adoption Rates of Applications” and “Customer Satisfaction” (9 each), followed by “Number of

Table 1: “Other” Performance Measures from Federal E-Government Initiatives

Burden reduction for corporations per return and/or application filed
Document recovery burden
Document search/retrieval burden
E-training is supplier of choice to fulfill human capital training at all Cabinet-level agencies
Impact on patient service, public health, and research
Improve situational awareness planning capability by 25 percent
Percent eligible data items archived/preserved electronically
Percent reusable information per grant application
Percent GPEA burden associated with transactions that use the E-Authentication gateway
Reciprocation between agencies (target—eliminate all unnecessary investigations of similar/lesser scope on same person by different agencies, within one year of each other)
Use of analytics by all Cabinet-level agencies in the Human Capital Planning process
Voice, data, and video convergence (target = 5 percent increase)

Figure 3: Frequency of Use—State and Local E-Government Performance Measures

Visitors, Page Views, or Hits” (8), and “Number of Agencies Participating” and “Number of Transactions or Uses” (5 each). Then, there are several measures used just a few times, including “Accessibility of Sites,” “Common Look and Feel of Sites,” “National Rankings or Awards,” “Reliability,” and “Number of Search Engine Inquiries.”

Table 2 presents the miscellaneous performance measures for states and local government entities. As with federal agencies’ measures, there is a wide variety among these measures, mostly owing to the differences in the types of online services provided by each jurisdiction as well as each jurisdiction’s approach to performance measurement.

There are clearly major differences between the types of measures found among state and local jurisdictions and those found among the federal agencies, although the technology measures are basically the same. The differences are generally due to the differences in the types of services found at each level of government and between the different types of services found across governmental agencies.

Categories of E-Government Measures

Performance measures can be grouped, as mentioned earlier, according to whether or not they are input, output, outcome, or efficiency measures. But they can also be considered according to which type of e-government measure they are. E-government performance measures can be categorized into one of two groups, either web- or technology-based measures or measures related to the specific services provided.

Web/technology measures are those that measure e-government as web-based activity only. These include technical measures such as number of hits or user contact sessions, number of downloads of documents, number of page errors, and percentage of website “down time.” These are the types of measures that distinguish e-government from other types of services; they are provided in highly technical, 24/7/365 environments that operate in real-time.

Table 2: “Other” Performance Measures from State and Local E-Government Initiatives

Agency effectiveness
Dollars collected
Complete implementation of portal
Consistent
Ease of use: the number of service requests and transactions started and subsequently completed
Effective governance
Efficient
Increased alternative funding sources—amount budget funded through alternative sources; number of non-tax based funding sources
Increased business participation in e-business and e-forums
Lacks coordinated response, has significant levels of functionality but no common look, feel or navigation aids, organized along department lines
Navigable
Number of agencies deploying enterprise solutions
Number of agencies using web design templates
Number of help desk inquiries
Number of locations from which portal is accessible
Number of public-private partnerships
Number of sites where people can find out about portal
Online feedback
Participation by end users in the procurement process
Percentage of agencies using IT performance measures
Percent of websites accessible from portal
Quality
Quality of the transmission and receipt of information to local, state and federal agencies
Quality of the transmission and receipt of information to school districts and non-government agencies.
Rapid
Responsive
Uses common authentication scheme

Service-based measures are those that focus on e-government as service delivery. These are typically very specific to the types of services being provided. Examples include adoption rates, customer satisfaction measures, timeliness (amount of time required to respond to an e-mail request), cost per transaction, access, and effectiveness. Many of these are measures that are found when measuring traditional services.

Table 3 categorizes the states and cities plus the federal government agencies found to have performance measures that can be categorized as web/technology measures, service-based measures, or both. In addition, jurisdictions were categorized according to whether or not their measures were specific enough to be measurable, or whether their measures were general. General measures are typically not written in such a way that their achievement could actually be measured.

There are nine jurisdictions, including federal agencies, that include both web/technology measures and service-based measures. These are Alaska, Mississippi, Missouri, Rhode Island, Texas, Virginia, Washington, the city of San Francisco, and federal agency efforts. Several other jurisdictions focus strictly on service-based measures (6 jurisdictions were identified here) and only a few focus primarily on web/technology measures.

Table 3: Jurisdictions with E-Government Performance Measures

	Web Technology Measures	Service Measures	Both
General	Maryland	Alabama Arizona Iowa Massachusetts Minnesota Seattle	San Francisco
Focused/Specific	Kansas South Carolina		Alaska Mississippi Missouri Rhode Island Texas Virginia Washington Federal Government

Examples of State Measures

Examples of measures from several states are presented in this section to illustrate the direction that many jurisdictions have taken.

Two of Alaska's measures are explicit, although the first is undoubtedly overly ambitious. There is some balance between web/technology and service-based measures, but more measures are certainly needed to cover all of the online services that Alaska provides. Further, the web/technology measures are not specific and would therefore be difficult to measure.

Most of Missouri's measures are stated explicitly as performance measures. Others are inferred from annual reports, where, because they are derived from reported data, they clearly report performance but are not included in the list of performance measures. The measures themselves are far more information-technology oriented and much less e-government oriented than those from many other states. However, these were included because the context in which they were found was specifically e-government. They lack service-based measures and most of the web/technology measures that could be used. In addition, the measures them-

Alaska's Performance Measures

Alaska's measures are only indirectly stated, as goals, but they are very inclusive:

- 100 percent of all public information is available over the Web
- 90 percent of high-priority business transactions are available via the Web
- The state's website:
 - Has a common look and feel
 - Offers alternative navigation paths
 - Incorporates an effective search engine
 - Uses a common authentication scheme

Source: State of Alaska. 2002. Statewide Information Technology Plan October 31, 2002. Available at <http://www.state.ak.us/local/akpages/ADMIN/home.htm>.

Missouri's Performance Measures

These measures are taken from Missouri's Information Technology Strategic Plan, where they are explicitly stated as performance measures.

- Increased accessibility of government services
- Increased security/privacy
- Increased alternative funding sources
- Increased architectural compliance
- Number of public-private partnerships
- Percent of information technology projects that are architecturally compliant
- Percent of technologies recognized in our accessibility standards that are compliant
- Number of non-tax base funding sources
- Percent of agencies using performance measures on IT projects

Source: Missouri Office of Information Technology. 2002. *Information Technology Strategic Plan*. Available at <http://oit.mo.gov/current%20reports/current%20reports.html>, August 2002.

- Number of page requests
- Average number of page requests per day

Source: Wethington, Gerry. 2003. E-Government Quarterly Report *Third Quarter FY 03*. Available at <http://oit.mo.gov/current%20reports/current%20reports.html>.

selves are not specific enough to ease measurement. This is particularly true of "National Awards," which should be operationalized to include which awards and what levels of awards would be considered acceptable and what would not.

Except for "online feedback," Rhode Island's measures are specific and measurable, but the focus is primarily web/technology measures. The only service-based measure is the first—the growth in the number of motor vehicle registration renewals online. To improve its measurement systems, Rhode Island would need to achieve a balance between the two types.

Rhode Island's Performance Measures

Rhode Island's measures are directly related to five information technology goals. Of these, Goal 4 (Assure Convenient Public Access to Government Information and Services) is related to their e-government efforts. The measures include:

FY 2002 Benchmarks

- Growth in the number of motor vehicle registration renewals online
- Percentage of websites accessible from the portal
- Number of applications accessible online
- Number of sites where people can find out about the portal
- Number of locations from which the portal is accessible

FY 2002 Evaluation

Portal:

- Number of hits at portal
- Number of applications operating from portal by June 30, 2001
- Savings at point-of-sale operations of applications now online from reduction in workload due to transfer to corresponding WWW activity
- Online feedback

Web Hosting Facilities:

- Webtrends statistical profiles

Source: Rhode Island Goals and Objectives, 2002. State of Rhode Island, Available at <http://www.irmb.state.ri.us/5yrplan/Default.htm>.

Washington's Performance Measures

- Drivers' licenses processed through DIS system
- Vehicle registrations processed through DIS system
- Law enforcement inquiries (drivers and vehicles)

Source: Washington State Department of Information Services. 2002. Strategic Plan and Operating Budget Department of Information Services, available at <http://www.wa.gov/dis/role/strategicplan/index.htm>.

found in the plan are not followed up by performance measures to help ensure that the plan's implementation is monitored. There are data, however, on certain items, and these can be inferred as measures by which their performance is being monitored. These measures are all service-based measures, so more web/technology measures should be added to round out the performance picture. Washington's performance measures should be developed more fully and expanded drastically.

Washington State is typically known as one of the most important innovators in e-government and information technology. This has been particularly true of its planning efforts for such initiatives. The *State of Washington Department of Information Services Strategic Plan and Operating Budget* is an outstanding example of a well-thought-out strategic plan. Unfortunately, the objectives and strategies

Best Practices in E-Government Performance Measures

Two jurisdictions, Mississippi and Virginia, were selected from among the 18 using e-government performance measurement to represent best practices. The selection was based on the fact that these jurisdictions had clearly delineated some e-government performance measures of both types (service-based and web/technology measures) and had done so in a more comprehensive fashion that could serve as a role model for other jurisdictions.

Mississippi's Strategic Planning and Performance Data

The Mississippi Department of Information Technology Services “provides statewide leadership and services that facilitate cost-effective information processing and telecommunication solutions for agencies and institutions.”¹⁸ As part of its mission statement, Mississippi strives to be a service-oriented technology leader, facilitator, and resource provider.¹⁹

The department conducts updates of its strategic master plan each year, incorporating new technologies, trends, and directions into its services. The department has six divisions, including Strategic Services, Voice Services, Data Services, Information Systems Services, Education Services, and Internal Support. E-government is managed under the Strategic Services division. The department operates under an executive director, who in turn reports to the ITS board. The master plan deals with all information technology and telecommunications issues, not just planning for e-government.

The Mississippi master plan presents four strategies:

1. Develop enterprise solutions to achieve shared benefits of technology.
2. Provide innovative and timely information technology training to all levels of state employees.
3. Provide the technology infrastructure and state-level support for the effective use of information technologies by agencies and institutions.
4. Encourage the management and funding of IT as a strategic investment.²⁰

The overall goal of the department's e-government effort is “seamless government—making government information and services readily available to all Mississippi citizens at all times in a way that emphasizes government as an enterprise, not a bureaucracy.”²¹ Under Strategy 1, there are six goals that are intended to aid in the strategy's implementation. They are:

1. Develop and implement strategies for enterprise solutions for Electronic Government initiatives.
2. Encourage and facilitate collaboration among state agencies to plan and implement enterprise IT solutions. (This explicitly includes e-government initiatives.)
3. Develop an enterprise architecture for state government.

4. Raise awareness of the need for enterprise approach to government technology and seek associated funding and sponsorship.
5. Complete the research of enterprise IT policies and standards and recommend a methodology and plan for updating and publishing.
6. Provide portal services for citizen, business, and employee access to state government.²²

Other strategies also include e-government goals; these are focused on training to implement e-government, updating of Internet infrastructure, adoption of new technologies, and innovative procurement processes. As of the writing of this report, Phase I of Mississippi's e-government initiatives had been completed. This included creating the basic infrastructure, implementing a new portal, creating license applications for four agencies, and developing the payment infrastructure so that online payments could be accepted.

According to the master plan, Mississippi e-government was funded by a one-time allocation to the Department of Information Technology Services by the State Legislature.

Mississippi's Performance Measures

The state of Mississippi reports data on performance measures that are well balanced between web/technology and service-based. However, these measures are not specifically stated in the master plan; they are found only in the annual report. In addition, the set of measures could be much more comprehensive, written to include the wider variety of services provided by the state. These measures include the following:

- License adoption rates
- Online license renewal rates
- Number of visitors per month
- Number of help desk inquiries
- Number of online transactions
- Number of agencies and sites supported
- Number of applications developed and piloted
- National awards²³

Virginia's Strategic Planning and Performance Measures

Virginia is one of two states with cabinet-level technology officials. The Governor of Virginia tasked Secretary of Technology George Newstrom with developing and implementing the state's information technology strategic plan. As a result of his efforts, not only were the state's IT agencies recently reorganized, but additional initiatives were proposed and adopted according to principles of exponential and urgent—not incremental—change. Performance measurement is a central implementation principle for the technology strategic plan, as it is for the entire state of Virginia.

Currently, VIPNet (the Virginia Information Providers Network), which operates Virginia.gov and the premium services within it, is part of the Virginia Information Technologies Agency (VITA), itself a new agency consolidating information technology services under one umbrella for Virginia's executive agencies. The VIPNet Authority, the precursor of the current agency, was created in 1996; the Authority was disbanded and VIPNet moved to VITA in July 2003. In fact, this reorganization was recognized by the National Association of State Chief Information Officers (NASCIO) for an award in the category of information technology management.

The VIPNet mission is "to establish a single, common gateway to government information that will improve access to free information, while at the same time, build value-added services for commercially viable information that is of interest to the business community."²⁴ VIPNet is run as a public-private partnership, with expenses paid for by charging fees for enhanced, premium services.

As a whole, the state of Virginia has a very comprehensive and advanced performance measurement system,²⁵ which has been in place since 1995. These measures are reflected in the state's IT strategic plan, where they are found organized by IT initiative. The system links four essential management processes—strategic planning, performance measurement, program evaluation, and performance budgeting. The product of these processes is a focus on overall goals and strategies to improve

performance and to easily communicate the results of government activities. In addition to reporting the measures themselves, performance data as far back as 1996 are also available, along with primary data sources and how the data was collected.

Virginia's performance measures include quality-of-life measures for nine service areas: community, economy, education, environment, families, government, health, safety, and technology. For the technology area, the quality-of-life measures are the percent of Virginians who have access to the Internet either at home or at work, and the percent of Virginians with a computer in their home.

Because the two agencies were only recently combined, VITA's performance measures do not yet include specific e-government measures; they are considered separately. VITA's information technology measures include more enterprise-level information technology measures such as:

- Average time in hours to resolve reported critical problems
- Level of satisfaction with the quality of services provided by the System Development Division as measured through client surveys (percentage)
- Percentage of long distance service cost discount per unit supporting state government versus standard private sector rates (discount from AT&T switched-to switched daytime tariff)
- Percentage of information technology procurements that represent resource sharing initiatives²⁶

E-Government Efforts

Virginia's information technology strategic plan is very focused on e-government in the context of contemporary information technology and enterprise management. The plan states:

The purpose is to expand the choices people have in dealing with their government. Broader than "electronic government" or "e-government," Virginia is building "digital government." The digital government model takes advantage of the possibilities for real transformation in the operation of public agencies. Digital govern-

ment is digitally enabled government from end-to-end—using modern technology to share information across and deep into the enterprise. In the 21st century, digital government is:

- Citizen-facing;
- Transformational;
- Accountable;
- Efficient; and
- Fundamental.

As Chief Information Officer (CIO) for the Commonwealth, the Secretary of Technology fosters digital government by providing enterprise infrastructure and services, strategic direction and oversight, and leadership. These three characteristics must be in a harmonious balance for the CIO to deliver on the Governor's imperative to use Virginia's technology resources most effectively and efficiently.²⁷

Of the eight initiatives featured in Virginia's IT strategic plan, one is focused on Virginia's e-government efforts. This is: "to revolutionize service delivery to our customers,"²⁸ which involves implementing the "customer-facing" portal and increasing online services.

To achieve this initiative, the state wants to create web design templates for its agencies to use as a way of creating a common look and feel for all agencies' websites. As part of these plans, the state is developing a content management system; implementing security training and assessments and live online customer service; and working on privacy issues.

To measure the accomplishments of these tasks, the plan proposes the following performance measures:

1. By June 2003, at least 10 agencies will deploy some or all of the enterprise solutions and at least 20 agencies will use the web site design templates.
2. By June 2004, at least 20 additional agencies will deploy some or all of the enterprise solutions and at least 30 additional agencies will use the web site design templates.

The second initiative is to increase the quantity, quality, and adoption percentage of online services. The state estimates that currently, 50 percent of all their forms are available online for citizen access. However, these forms are typically static and downloadable and do not represent the interactive form of service delivery desired by state managers, who are also motivated by the 2001 study by a Brown University researcher that found Virginia to be in the bottom five of states in providing online professional license renewals. The study also found that no agency allowed initial online license applications. Even so, some agencies (e.g., DMV) were already recognizing cost savings from their web applications.²⁹

From that position, the state would like to move forward in transforming its application processes, creating real-time applications and using the web to enable businesses and citizens. Among the strategies the state plans to use are the development of an electronic payments portal, wireless services, an activities calendar, shopping cart functionality, and other tools; active measures to increase the number of professionals applying for and renewing their licenses online; movement toward developing six new online services (boat registration, hunting and fishing license registrations, pesticide permit renewals, job registration services, moving violations payments, and criminal background checks); and continued development of the one-stop Virginia portal.

Three performance measures were developed that specifically address this initiative. They are:

1. Fully interactive, integrated online business processes will be provided by 100 percent of all executive branch agencies by June 2004.
2. A 50 percent adoption rate for web-enabled business processes will be achieved by June 2004.
3. By the end of FY 2003, increase participation in the e-business villages and e-forums by 15 percent.³⁰

Virginia is making rapid changes in its information technology. They have made a good beginning with the very specific performance measures here, along

with those of other areas of state services. These measures need to be expanded, but they represent a good initial effort. Applying these lessons to information technology and e-government will provide an excellent role model for the rest of the country.

Best Practices in Developing Performance Measurement Data

In addition to the two jurisdictions that were selected to represent best practices in developing performance measures, two other jurisdictions (agencies of the U.S. government and the state of Texas) were selected to represent best practices in developing performance measurement data. Federal agencies now have the opportunity to develop critical customer satisfaction data. Texas also provides examples of a wide variety of measures, among them cost-benefit ratios for e-government services. Finally, Minnesota provides an interesting example of how surveys can provide performance data.

U.S. Government and Customer Satisfaction

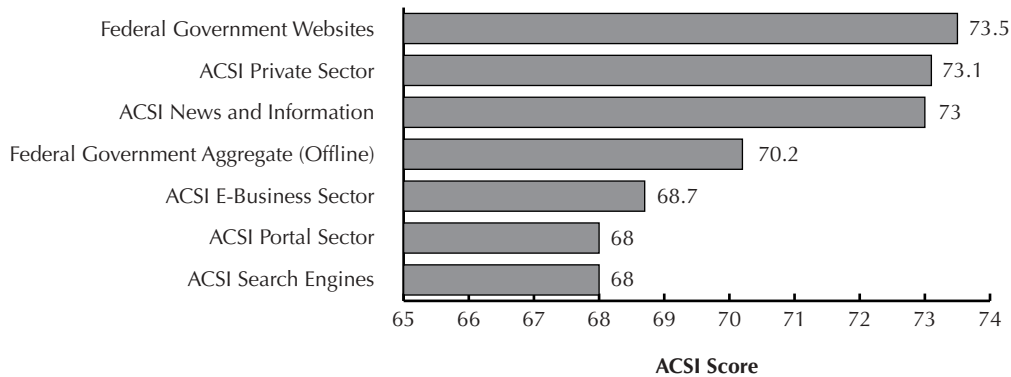
Since the late 1990s, federal agencies have been measuring “customer” satisfaction of citizens interacting with federal agencies—a critical performance measure for e-government today. These efforts have been expanded recently to include customer satisfaction of individual citizens using federal agency websites.

Since both private companies and public agencies have been subjects of this research, ForeSee Results, the private company conducting the research, has been able to use a statistical index (ACSI—the American Customer Satisfaction Index) to investigate customer satisfaction in the e-commerce, e-business, and e-government sectors. These comparisons have then been used to compare customer satisfaction for federal agency websites with that of private companies and public agencies. Seven

industrial sectors are included in the Index, representing 38 industries and nearly 200 companies and public sector agencies.³¹ ForeSee has evaluated approximately 30 government sites and between 70 and 75 private sector sites.

Figure 4 presents a comparison of the ACSI scores for federal government websites against the score for various private sector sites. As can be seen in Figure 4, the December 2002 ForeSee Results report indicates that federal government websites performed slightly higher (average score of 73.5 on a 100 point scale) than comparative sites in the private sector (ranging from an average of 73.1 overall for the sector to 68 for search engines and portals) but do definitely outperform the News and Information sites, Search Engines, and E-Business sites.

Larry Freed, President and CEO of ForeSee Results explains, “The high satisfaction scores by the government websites confirm and reinforce their effectiveness and significance in delivering services and information. Like other industries, the government is finding that the Internet can provide considerable value at a lower cost and with more efficiency than traditional methods. Delivery via websites gives organizations the ability to control the consistency and quality of information and services better than traditional customer service delivery methods driven by people disseminating information. In addition, websites offer a higher level of convenience, allowing citizens to access information and services anytime, from anywhere. The e-government results demonstrate the ability government websites

Figure 4: ForeSee Results—American Customer Satisfaction Index Scores

Source: *ForeSee Results, 2002. American Customer Satisfaction Index 2002 Governments Services, December 16, 2002.*

have to effectively use the Internet to deliver services and information with lower cost, higher consistency, and in a convenient manner to support a citizen-centric government."³²

Table 4 lists the eight federal government websites on which this judgment was based, along with their individual ACSI scores. These agencies range from

the Office on Women's Health within the U.S. Department of Health and Human Services, which received the highest score of 80, to a score of 69 for the Pension Benefit Guaranty Corporation. One site received a score of 80 for users' likelihood to visit the sites again and one a score of 76 for the users' potential to recommend that others use the site. Special attention goes to the FirstGov website

Table 4: ACSI Federal Website Scores, 2002

ID	Websites	Customer Segment	Satisfaction Score
OWH	Office on Women's Health, HHS	National Women's Health Information Center Website Users	80
DOS	Department of State	DOS Careers Website Users	76
NASA	National Aeronautics and Space Administration	NASA Education Website Users (NASA Education Program & NASA Spacelink)	74
DOS	Department of State	Department of State Main Website Users	73
DOS	Department of State	International Information Programs Website Users	72
GSA	General Services Administration	FirstGov Website Users	72
OPHS	Office of Public Health and Science, HHS	Office of Disease Prevention & Health Promotion Website Users	72
PBGS	Pension Benefit Guaranty Corporation	Pension Benefit Guaranty Corporation Website Users	69

Source: *Freed, Larry. 2002. American Customer Satisfaction Index—2002 Government Services ForeSee Results, December 16, 2002, p. 4.*

ACSI Methodology

Researchers at the University of Michigan, led by Dr. Claes Fornell, Director of the National Quality Research Center, developed the ACSI tool initially.³³ In 2001, ForeSee Results began to use the ACSI to evaluate customer satisfaction with federal agency websites.

Most analyses use simple counts of web experiences—number of hits, number of pages viewed, or number of visitors. The advantage of the ACSI, a well-researched and benchmarked set of questions and research processes, is that it uses a causal statistical model to predict customer behavior, like the probability of returning to the website. General customer satisfaction is determined using randomized telephone interviews with individuals, while satisfaction with websites is examined using pop-up surveys.

These results are then analyzed using the model, which includes both measures of customer satisfaction and of customer loyalty. The resulting index is a nationally based measure that includes multiple industries, companies, and agencies. As such, the measure and the process itself have been tested for validity and reliability and can be used with some degree of confidence.

The index is produced quarterly by University of Michigan researchers; it includes more than 200 organizations, which constitute greater than 45 percent of the gross domestic product. The non-online company activity is evaluated by random telephone surveys; these are conducted once per year. The websites are evaluated by electronic pop-up surveys composed of 10 to 20 questions. The surveys are programmed to pop up randomly, dependent upon the traffic pattern of the particular website. An ideal target would be to evaluate the first 300 responses then run the survey again for every 60 responses. Then, the results from the first 60 are dropped to form a moving average of 30 responses, and so on. Most government websites do not allow the use of cookies so they cannot track user responses and whether or not users return. Therefore, the researchers need a larger sample but still want to keep it low enough that users are not alienated. The sampling strategies are based upon site traffic patterns; the largest sampling percentage for a government site is 2 percent.

ForeSee Consulting began using this process with a beta version in 2001; they were able to evaluate websites starting in January 2002.

An analysis by the University of Michigan researchers of the two survey types (pop-up vs. opt-in) indicates that the pop-up surveys have the lesser sample bias of the two.

(an early user of the ACSI process), the portal into federal government agencies run now by the U.S. General Services Administration. ForeSee Results reports they now receive a score of 72, a significant increase in satisfaction score and loyalty after a substantial redesign of their site.

For comparison purposes, Table 5 presents the February 2003 e-retail ACSI scores for the highest scoring e-retailers (well-known to most who spend any time online). These scores and their changes over time provide an important context for the federal figures seen in Table 4. The overall average for the entire e-retailing sector was 83, while that for the federal websites was 73.5 with a high of 80 for the Office of Women's Health.³⁴

Table 5: E-Retail ACSI Scores, February 2003

Company	2002	2001	2000
E-Retail Average	83	77	78
Amazon.com, Inc.	88	84	84
Barnes & Noble.com, Inc.	87	82	77
Buy.Com, Inc.	80	78	78
1-800-Flowers.com, Inc.	78	76	69
All Others	82	75	77

Source: Freed, Larry. 2003. Draft: American Customer Satisfaction Index—Annual E-Commerce Results ForeSee Results, February 18, 2003, p. 3.

In September 2003, updated ratings were released containing scores for 22 federal agencies (see Table 6, page 28). The 2003 scores show federal websites with customer satisfaction rates as high as 83, which is comparable to the best of the private sector websites (like Amazon.com at 88, Google.com at 82, and Yahoo.com at 78). Clearly, many federal websites provide citizens with high levels of customer satisfaction that make customers apt to return for additional services and information. These scores also represent improvements from just nine months earlier.

From September 2003 onward, ratings will be released every quarter as opposed to once each year.

Impact of the Use of ACSI for Federal Agencies

Bernard Lubran of the Federal Consulting Group in the U.S. Department of Treasury states, "Government agencies do not have a monopoly on information; citizens can choose where they get their information; they have choices today. If government agencies don't give them quality on their websites, they will lose these citizens as users. Their agency sites should have good content, a good download rate, a good search engine, and should be convenient and attractive. Since citizens are inevitably comparing their government website experience to the private sites they have also visited, it is fitting that the citizens' experience with both should be compared."³⁵

He also believes that, in today's budgetary situation, web managers fully understand the need to obtain hard data and comparative results on the effectiveness of their sites to argue for support and funds for their e-government and web efforts. They understand that change is constant, that they have to be more adaptable to change, and that they have a lot to learn from private sector web efforts. This culture and these imperatives make the ACSI methodology very attractive to web managers, as the pressure increases to show results for their agencies.

Texas' Cost-Benefit Analysis and General Performance Measures

The TexasOnline portal was selected as a representative of best practices due to its consistent and

outstanding use of a standard set of performance measures as well as the state's efforts in determining the effects of its e-government initiatives via cost-benefit analyses.

The portal for the state of Texas was created in response to constituent complaints regarding inefficiencies in licensing processes. State Senator Elliott Shackley was instrumental in promoting the need for e-government applications and customer surveys to ensure that Texas was meeting its citizens' needs.³⁶

In 1999, Senate Bill 974 was passed. The bill created an electronic government task force for the state, which attempted to determine whether or not a common system using the Internet could be established to provide information and documents and to receive payments and online applications. The task force created a system not funded by Texas public funds but operating as a private-public partnership—with a web presence and applications largely developed by the Texas Online Authority staff and implemented by a private consulting firm. In fact, the TexasOnline Authority office itself has only 10 employees. Its funding comes from user fees paid by the website's customers.

By 2001, TexasOnline was up and running and the TexasOnline Authority was created to run the project. The legislation creating the TexasOnline Authority specifically stated that it needed to evaluate the services provided.³⁷

The resultant system uses one structure for payment, allows local governments as well as state agencies to use this structure, and coordinates all web applications. The TexasOnline Authority has to report to the state legislature every two years; those reports are outstanding examples of performance-based reporting. In addition, all applications have customer surveys attached to them, as does the portal itself to aid in the evaluation and reporting.

The Department of Information Resources has three performance measures specific to e-government:

- Number of applications available through the portal
- Number of transactions conducted through the portal

Table 6: ACSI Federal Website Scores, September 2003

Agency or Office	Websites	Address	Satisfaction Score
Offline Social Security Administration			83
Health and Human Services	Office on Women's Health National Women's Health Information Center (NWHIC) website users	www.4women.gov	83
NASA	NASA main website	www.nasa.gov	79
NASA	NASA Education Program and NASA Spacelink	www.spacelink.nasa.gov	78
Department of Agriculture	Economic Research Service (ERS)	www.ers.usda.gov	76
FirstGov	FirstGov.gov	www.firstgov.gov	74
Department of State	Careers.state	www.careers.state.gov	73
Health and Human Services	Office of Disease Prevention and Health Promotion (ODPHP)	www.healthfinder.gov	73
Department of State	Department of State Main	www.state.gov	72
Office of Personnel Management	Job search	www.opm.gov	71
ACSI E- Government (i.e., Online) Aggregate			70.9
ACSI Offline Government Aggregate Score			70.2
Department of Agriculture	Forest Service	www.fsa.usda.gov	69
Department of State	International Information Programs (IIP)	www.usinfo.state.gov	69
General Services Administration	GSA Advantage website	www.gsaadvantage.gov	66
Pension Benefit Guaranty Corporation	PBGC	www.obgc.gov	66
Department of Treasury	Treasury main website	www.treasury.gov	64
Corporation for National & Community Service	CNS Main website	www.cns.gov	63
Federal Aviation Administration	FAA main website	www.faa.gov	62
Department of State	Geography website	geography.state.gov	61
Department of Labor	Employment Standards Administration	www.union-reports.dol.gov	58
General Accounting Office	GAO main website	www.gao.gov	56
General Services Administration	GSA main website	www.gsa.gov	56
Department of Transportation	DOT main website	www.dot.gov	55
Internal Revenue Service Offline (paper tax filers)			53
National Oceanic and Atmospheric Administration (NOAA)	Mapfinder	www.oceanservice.noaa.gov/ mapfinder	51

Source: Adapted from Freed, Larry. 2003. American Customer Satisfaction Index E-Government Satisfaction Index September 15, 2003, ForeSee Results.

- Percentage of visitors satisfied with TexasOnline³⁸

This plan is extremely well defined and well organized. It includes five-year projections for most outcome measures, detailed definitions for each measure, plus breakdowns of each goal and strategy with accompanying measure. However, the TexasOnline Authority now operates independently of the department, so the application of these performance measures is beyond its control.

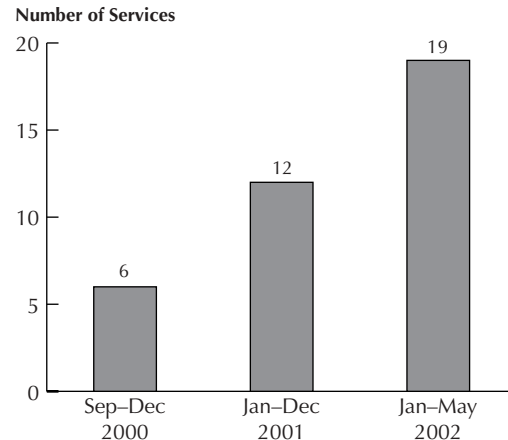
The TexasOnline Authority itself used the following performance measures to provide data in its 2002 annual report; they do not declare these are performance measures but clearly consider them to be so, as they provide longitudinal data for each. They are:

- Total number of visits
- Total transactions
- Total dollars collected
- Services offered
- Participation of state agencies, local governments, and institutions of higher education
- User adoption rates
- Customer satisfaction³⁹

Figures 5 and 6 (see page 30) illustrate the growth in services since the site's inception and in the number of visits to the portal during a nine-month period. Clearly, the number of applications has grown exponentially and the number of visits tripled in nine months (from September 2001 to May 2002). Services now include:

- Driver license renewal
- ID card renewal
- Vehicle registration renewal
- Local government utility and property tax payments
- State sales tax payment
- Occupational licensing for real estate agents, insurance agents, nurses, and others
- Information access to many databases

Figure 5: Growth of Services of TexasOnline



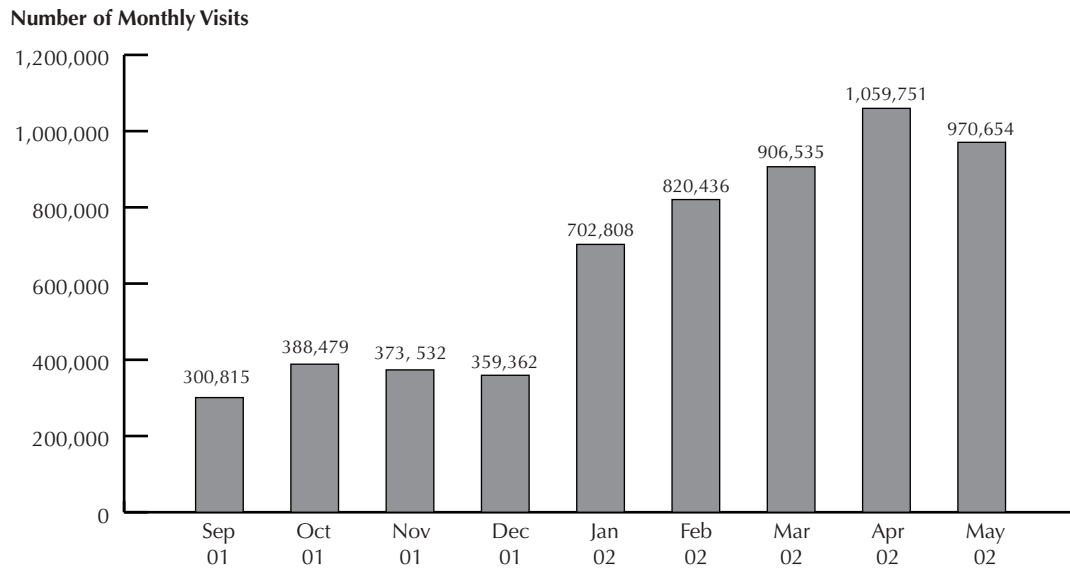
Source: TexasOnline Authority, 2002. TexasOnline 2002 Status Report: Progress and Efficiencies Gained September 1, 2002, p. 9.

Undoubtedly due to the growth in the number of type of applications available, the growth in the number of transactions conducted is even more impressive (Figure 7, page 30). These grew from less than 10,000 per month in September 2001 to more than 750,000 for three straight months, March through May 2002.

Due to this growth and the requirement for one central standard of transaction processing, TexasOnline is able to track the dollars it has raised to support its operations (see Figure 8, page 31). Beginning with earning just in excess of \$1.25 million in the September to December 2000 period, they rapidly expanded to earning more than \$53.5 million in 2001 and brought in more than \$84 million in just the first five months of 2002.

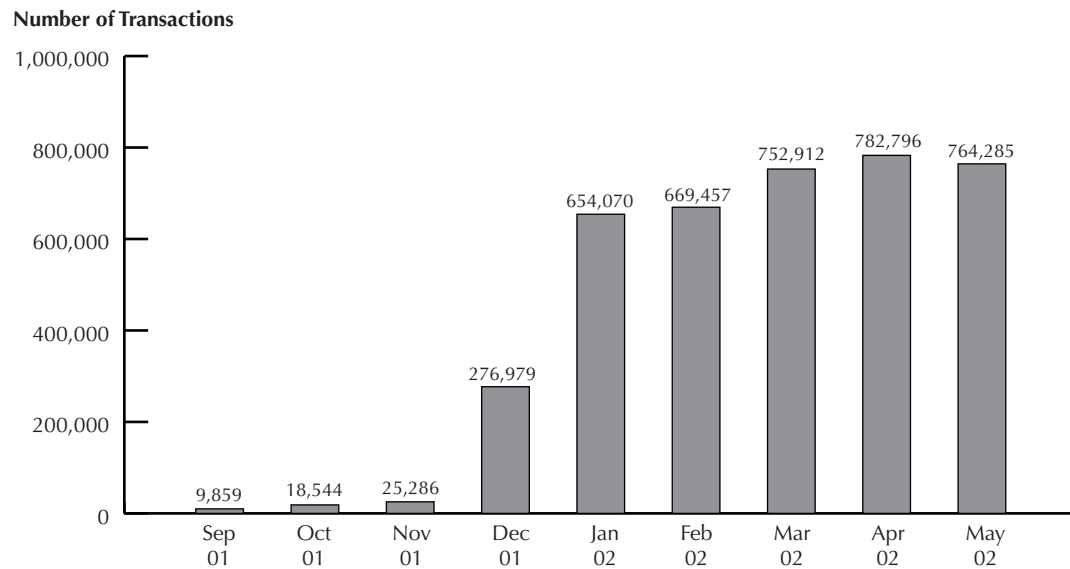
Table 7 (see page 32) presents the estimated adoption rates for FY 2002. These are important for several reasons. One, they are outstanding examples of very complete performance information. But more importantly, this is the most complete set of comprehensive information gathered on the most applications seen at any state's or large local municipality's e-government website. Undoubtedly, this data represents the most complete picture to date of e-government application adoption rates. These rates represent the percentage of users of the service out of the potential number of users. These rates are similar to, or better than, other jurisdiction's adoption rates.

Figure 6: Number of Monthly Visits of TexasOnline



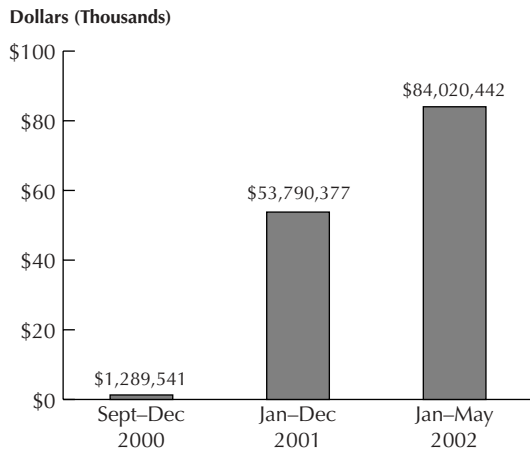
Source: TexasOnline Authority, 2002. TexasOnline 2002 Status Report: Progress and Efficiencies Gained September 1, 2002, p. 10.

Figure 7: Number of Transactions at TexasOnline



Source: TexasOnline Authority, 2002. TexasOnline 2002 Status Report: Progress and Efficiencies Gained September 1, 2002, p. 11.

Figure 8: State Dollars Received through TexasOnline



Source: TexasOnline Authority, 2002. TexasOnline 2002 Status Report: Progress and Efficiencies Gained September 1, 2002, p. 12.

Customer Satisfaction Surveys

In addition to tracking some important performance measures, the TexasOnline Authority also examined customer satisfaction through surveys. These surveys were linked to websites so that users of the portal or of specific online services would be requested to complete them. This methodology runs a high risk of increased positive bias because those who are either very happy or very unhappy are those motivated to complete the survey.

Portal Survey. Those visiting the portal answered questions about why they were visiting, how they found out about the site, and what they would like to see there in the future. They were also queried about whether or not they found what they were looking for—an element of customer satisfaction. Forty-seven percent agreed or strongly agreed that they did find what they were looking for, while 15 percent disagreed. Another 38 percent said the question was not applicable.⁴⁰

Survey of Service Users. Those who used the services were asked more extensive customer satisfaction questions; 2,270 responses were included in this analysis. Customer satisfaction with the services available at TexasOnline was clearly very high. Eighty-three percent of those who responded strongly agreed that TexasOnline was an improved

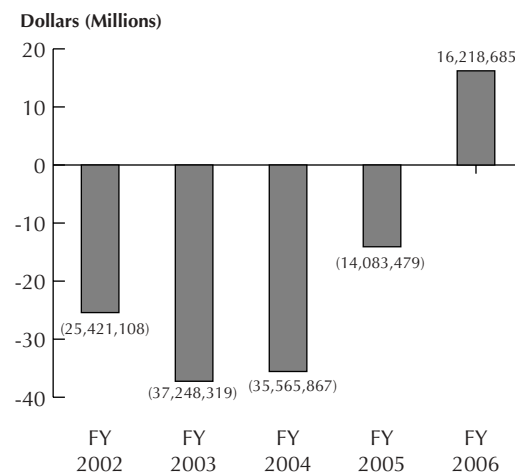
method of service delivery. Ninety-nine percent found that instructions were clear and 98 percent would recommend the services to friends. Ninety-seven percent of those using the services claimed overall satisfaction with them.⁴¹ Answers to open-ended questions also suggested both a high degree of satisfaction with the services and a high degree of satisfaction with convenience. However, there was some dissatisfaction with having to pay a convenience fee to use the service.

Return on Investment (ROI)

Many jurisdictions are showing a growing interest in the ROI of their e-government services. Since TexasOnline is totally self-supporting and receives no government funding, it is perhaps easier for them to determine an accurate assessment of their ROI than it would be for other jurisdictions. Figure 9 indicates the pattern of investment and estimated ROI for TexasOnline. Clearly, early implementation costs are high and some estimates are that there will not be a positive return on their investment until FY 2006. Whether or not these estimates prove correct is dependent on adoption levels, or how many citizens are using the service—the more using the service, the higher the adoption rate and the higher the ROI.

However, according to the TexasOnline Authority, operations will break even much sooner, in FY 2003.

Figure 9: TexasOnline Return on Investment



Source: TexasOnline Authority, 2002. TexasOnline 2002 Status Report: Progress and Efficiencies Gained September 1, 2002, p. 31.

Table 7: Estimated Adoption Rates for Fiscal 2002

Application	Adoption Rate
License Renewals	
Nurses Board License Renewal	3.4%
Texas Department of Licensing and Regulation Air Conditioning License Renewal	4.0%
Licensed Chemical Dependency Counselor Renewal	4.1%
Railroad Commission License Renewal	4.4%
Veterinary Board License Renewal	6.0%
Department of Insurance Agents License Renewal	9.3%
Real Estate Commission License Renewal	23.2%
Savings and Loan License Renewal	44.0%
Department of Public Safety	
Department of Public Safety Driver License Renewal	12.7%
Department of Public Safety Concealed Handgun License	27.3%
Department of Public Safety Driver Records	71.9%
Department of Transportation	
Department of Transportation Vehicle Registration Renewal	1.0%
Extension and Comptroller	
Texas Engineering Extension Course Registration	0.7%
Comptroller of Public Accounts Sales Tax	2.6%
Comptroller of Public Accounts Texas Tomorrow Fund	33.0%
Local Governments	
City of Mesquite Property Tax	0.1%
City of Mesquite Ticket Pay	0.2%
City of Dallas Water Bill Payment	0.2%
City of Houston Ticket Pay	0.6%
Travis County Property Tax	1.2%

Source: TexasOnline Authority, 2002. TexasOnline 2002 Status Report: Progress and Efficiencies Gained September 1, 2002, p. 16.

At that point, the TexasOnline Authority will be paying for all of its own operations; however, it will take until 2006 to pay for the capital and software/applications investments that have been made. Curiously, even though the portal and its funding model was created to ensure the portal was self-supporting, at this time, the revenues generated by services are being sent not to the TexasOnline Authority but are going directly into the state's general fund.

Cost-Benefit Analyses

In order to ensure that their self-funding model would in fact be self-supporting, TexasOnline has conducted ongoing cost-benefit studies of services provided through the portal. To do this, agencies completed a pre-implementation template identifying costs and benefits and did the same with a post-implementation template after the services had been conducted for a period of time. Seven agencies incorporating 11 online services agreed to participate in this portion of the evaluation services conducted by TexasOnline.

In the early years of these online services, there were both methodological and practical difficulties in estimating and achieving positive cost-benefits. One expected difficulty arose as many agencies did not keep records on the costs for each service but instead had these costs aggregated across services within departments. As seen in the discussion concerning ROI, in the early years of a service, returns are tempered by the need to pay for high capital and software and application development costs. In addition, the cost per transaction is a function of how many individuals within a target population use the service (i.e., the adoption rate). In the early years of these online services, adoption rates are typically low, but experience has already indicated that growth rates are steady, if not high. These issues lead to the expectation that costs will outweigh benefits in the beginning but, as investments are paid off and adoption rates increase, benefits will begin to outweigh costs.

The following benefits to Texas agencies were identified:

- Online services outsource data entry to the citizen, reducing the agency staff time spent on manual processing.

- Online services allow for automated error checking, reducing agency staff time spent on exception handling.
- Online services have reduced agencies' average processing time or "hands-on" time.
- Online services have reduced agencies' average turnaround time.
- Online services allow for the timelier deposit of funds, resulting in increased interest earned for the state.
- Online services can enable agencies to more easily implement subsequent programs or services online.
- Online services can enable agencies to streamline operations for particular processes.
- Online services can enable agencies to offer a service to an expanded number of locations without disbursing staff.
- Online services can reduce an agency's cost per transaction.⁴²

Results of the actual analyses are presented in Table 8 (see page 34). These indicate that, after subtracting out capital costs, the five services studied for TexasOnline's report (sales tax filing, Texas Tomorrow Fund, drivers' license renewal, agent license renewal, and information distribution) all showed reduced costs per transaction when moved online. These reductions were anywhere from only a 4 percent drop for the drivers' licenses renewal to a 71 percent decline for the sales tax filings.

The picture is clearly different when capital costs are taken into account. In that case, the cost per transaction increases when moved online. However, it is expected that low adoption rates at this point are keeping the costs per transaction high; once the number of transactions increases, the cost per transaction will decline. This will be particularly true when the capital costs can be spread over many more transactions, instead of concentrated on just a few, as is the case right now.

TexasOnline Authority and the state of Texas portal has accomplished a great deal, considering the lack of funding from the state itself. In terms of performance measurement, it is a critical point for others to understand, that they consider performance

Table 8: TexasOnline Authority Cost Per Transaction (CPT) Estimates

Service/ Stage	Pre- Implementation CPT	Post- Implementation CPT (with Capital Costs)	Change in CPT from Pre- to Post- Implementation (with Capital Costs)	Post- Implementation CPT (without Capital Costs)	Change in CPT from Pre- to Post- Implementation (without Capital Costs)
CPA–Sales Tax Filing	\$ 2.72	\$5.36	+ 97%	\$0.78	- 71%
CPA–Texas Tomorrow Fund	\$48.86	Not applicable	Not applicable	\$36.47	- 25%
DPS–Driver License Renewal	\$2.98	\$3.40	+ 14%	\$2.87	- 4%
TDI–Agent License Renewal	\$2.57	\$2.71	+ 5%	\$1.94	- 25%
TEA– Information Distribution	\$35.12	\$241.86	+ 589%	\$30.05	- 14%

Source: TexasOnline Authority, 2002. TexasOnline 2002 Status Report: Progress and Efficiencies Gained September 1, 2002, p. 10.

measurement and careful program evaluations to be essential to creating the accountability that will build public support for their efforts. In essence, it is part of their funding strategy. Clearly, they are setting an outstanding example for other jurisdictions to follow in the comprehensive nature of their performance efforts.

Minnesota's Customer Satisfaction Surveys

In the state of Minnesota, the Office of Technology (OT) operates the state portal, called NorthStar. After a substantial redesign of the site in 2001, the OT requested a survey of Minnesota consumers regarding citizen preferences and responses to e-government. The methodology of choice was a statewide random sample telephone survey, resulting in 652 respondents; 400 completed all questions because they had access to the Internet. The resulting survey respondents had relatively higher education levels than Minnesotans in general; otherwise, the demographics mirrored those of citizens not in the sample.⁴³

The types of questions in the survey included questions about who had access to the Internet and what might be keeping them from access; quality of access; types of services they would like to see on the Internet; willingness to pay extra fees for online services; and concerns or feelings about Internet security and privacy issues.

Of most interest to this report are the responses to questions about how much citizens are currently using NorthStar and how satisfied they are with those services. These are crucial performance measurement issues for any jurisdiction.

Results indicated that 10 percent of respondents in 2002 did business online at least weekly with Minnesota e-government or used the sites to research information. Nineteen percent did so at least monthly and another 32 percent did so, but less than once a month. Thirty-nine percent never conducted business online with Minnesota state government.⁴⁴ More specifically, 2 percent of respondents visited the state of Minnesota's NorthStar site during 2002; 12 percent visited more than once. Another 4 percent had heard

of the site but had never visited and the other 82 percent had never heard of the site.⁴⁵

The 57 survey respondents who had visited the site were asked other questions about their satisfaction, but the results should be used with considerable caution as the number is so small. Table 9 presents these results. Eighteen percent in 2002 and 20 percent in 2001 were very satisfied with their NorthStar website experience. Sixty-one percent in 2002, up from 52 percent in 2001, were satisfied. Only 14 percent were neutral about their experience in 2002, significantly reduced from the 21 percent in 2001. Only 4 percent were dissatisfied or very dissatisfied in 2002, slightly down from the 7 percent in 2001. Overall, these are high levels of citizen satisfaction, although the number surveyed was low.

Some of the most interesting and substantive information from the Minnesota survey is provided from

the question, “What aspects of the NorthStar website were you satisfied with?” (See Table 10.)

The most impressive factor was that 82 percent said it was easy to find the information they were looking for. This was followed by satisfaction with the level of detail provided (53 percent). Forty-two percent of those answering these questions stated satisfaction that the site had the service they wanted, and 40 percent stated the labeling of services and information was clear. Only 31 percent stated that they were satisfied with the site’s speed.⁴⁶

Minnesota’s performance measurement data collection efforts to date have focused upon customer satisfaction surveys. These have provided some useful data to use in improving e-government performance. Adding other web/technology and service-based performance measures to their portfolio would, of course, improve their ability to monitor these efforts.

Table 9: Minnesota NorthStar Survey—How would you describe your experience with the NorthStar Website in the past year?

	2002		2001	
Very Satisfied	18%	N = 10	20%	N = 15
Satisfied	61%	35	52%	39
Neutral	14%	8	21%	16
Dissatisfied	4%	2	7%	5
Very Dissatisfied	0%	0	0%	0
Don’t Know/Refused	4%	2	0%	0
Totals	101%	57	100%	75

Source: Table 19, State of Minnesota Department of Administration. 2003. Electronic Government Services Customer Survey January 2003.

Table 10: Minnesota NorthStar Survey—What aspects of the NorthStar Website were you satisfied with?

	2002	
It was easy to locate the information I was looking for	82%	N = 37
The information contained the level of detail that I wanted	53%	24
The site had the service that I was looking for	42%	19
The labeling of services and information was clear	40%	18
The site was fast	31%	14
Other / Don’t Know / Refused	4%	2

Source: Table 20, State of Minnesota Department of Administration. 2003. Electronic Government Services Customer Survey January 2003.

Recommendations

Clearly, results are mixed when considering how extensively governmental agencies are engaging in e-government performance measurement efforts. Some jurisdictions have done outstanding jobs of developing excellent performance measures to track how well they are doing with their e-government efforts, while many have apparently done relatively little. Others say they plan to incorporate measurement and accountability efforts but it is unclear how or when this will occur.

What can jurisdictions and agencies do as they work to develop their performance measurement efforts?

Overall Performance Strategy

1. Be proactive and develop an effective performance measurement system for your agency's e-government efforts.

Jurisdictions and agencies need to develop a wide range of performance measures to ensure accountability in the area of e-government and address each strategy and goal of the organization. Such a system should be integrated into the jurisdiction's overall e-government efforts.

2. Derive measures from the strategic planning process—the organization's mission, strategic issues, goals, and objectives.

No performance measurement system should be developed in isolation from the goals and direction of the organization. Ideally, performance measures should be derived directly from the organization's mission statement, strategic issues, goals, and objectives and should support them.

3. Incorporate measures into a process of continuous improvement.

Performance measures should be actively used to improve services, not just posted on a website and left until the next update of the strategic plan. Any data systematically gathered on an agency's e-government efforts would be valuable for use in considering possible improvements and should be actively used to do so. Don't miss the opportunity to use this important data.

4. Be creative.

In this constantly changing and expanding field, there is lots of room to experiment and to grow—be creative and try out new ways of measuring the effects of your e-government activities. There is no need to remain tied to traditional measures or even to those of the earlier generation of measurement efforts.

Performance Measurement Methodologies

5. Collect performance management data on a regular basis using consistent research methodologies and data-collection methods.

Effective data-collection methodologies need to be developed—and pilot-tested—to capture this data on a consistent basis, ensuring that comparisons over time can be made within a jurisdiction as well as to benchmarked comparison jurisdictions. Data reliability and validity are crucial, as they are for any research or evaluation effort.

6. Use a variety of measures —both web/technology and service-based.

These measures should include a variety of input, output, and outcome measures for both web/technology measures and service-based measures. It is important that not just web/technology measures be used, because the ultimate purpose of e-government is the provision of services. Table 11 (see page 38) presents a variety of both of these important types of measures. These are organized according to the two categories (web/technology and service-based) and according to whether the measures can be considered input, output, or provide some insight into intermediate or end outcomes. For outcome measures, service quality, efficiency and end outcome measures are included. Agencies can use this collection of measures, as well as those provided in the text of this report, as a starting point for their own efforts.

7. Choose measures over which your agency has some control.

Performance measures should be measurable and simple, but above all, they should be items over which the agency has some influence. Selecting measures that derive directly from the services provided by your agency will be the best route to understanding the effects of your agency's e-government efforts.

8. Pilot-test both measures and collection strategies to ensure they will work.

The measures and their collection strategies should be pilot-tested to ensure effectiveness. It is important to pilot-test performance measurement systems to determine if the methodology is accurate and also to assess how onerous the data collection process itself will be. There are established methodologies for conducting effective performance measurement and, to ensure effectiveness and reduce errors, these should be followed.

9. Work to achieve a balance between the usefulness of performance data and the costs in time and effort needed to gather and maintain the system.

Ensure that a balance is achieved between developing a system with numerous performance measures and the costs, in terms of time and expense,

of doing so. If the process appears to be too onerous, it would be important to reassess and see if it can be streamlined. A performance measurement system that is not used will generate resentment, not useful results.

Communicating Your Results

10. Communicate performance results in an open and understandable manner.

Measures should be communicated to decision-makers and citizens in a readily understandable and open format. Citizens should know how effective their government's e-government efforts have been as well as the full extent of the services that are being provided. There is also a great deal of anecdotal evidence to suggest that marketing is critical to the success of an online service—so it is important to talk about what you are doing. Show your citizens the great things that your agency has accomplished—as well as what you are planning for the future.

11. Publish performance results on the agency website.

Results of performance measurement efforts should be published on jurisdictions' websites to ensure that all citizens have access to the data and its interpretation. Ensure accountability by allowing citizens to know what you are accomplishing. In publishing the results, remember that not all citizens have the same understanding of government and how it works—so use jargon-free language and charts to illustrate your points. Make sure the performance data is available from a highly visible link and label it clearly so that citizens can find the information.

E-government today is a dynamic, ever-changing process that is moving as fast, or faster, than the technology itself. It is important that we learn how effectively our e-government efforts are being implemented—as well as what impact they are having on our citizens. Performance measurement can aid in accomplishing this goal.

Table 11: Potential E-Government Performance Measures

	Input Measures	Output Measures	Outcome Measures
Web/ Technology Measures	<ul style="list-style-type: none"> • Application development and hardware set-up <ul style="list-style-type: none"> – Staff costs – Other development costs – Other vendor costs – Staff time for application development – Other development time – Vendor time for development purposes 	<ul style="list-style-type: none"> • Number of hits or user contact sessions • Number of downloads of documents • Time users spend on a site • Number of times transactions completed, or the times online forms have been accessed and completed • Dollar amounts processed through each site 	<ul style="list-style-type: none"> • Accessibility of services <ul style="list-style-type: none"> – Number of site pages meeting accessibility criteria • Accuracy of the assistance or information as measured by percent accuracy rates in random fact checking • Adequacy of information as measured by staff and citizen surveys • Ease of use as measured by pop-up or other surveys • Citizen satisfaction with site itself <p>Service Quality</p> <ul style="list-style-type: none"> • Percent of time when website is down and not available • Minimal webpage errors <p>Efficiency</p> <ul style="list-style-type: none"> • Cost per transaction • Total cost per user session <p>End Outcomes</p> <ul style="list-style-type: none"> • Cost savings from e-government • Staff time savings from e-government
Service-Oriented Measures	<ul style="list-style-type: none"> • Maintenance and application improvement <ul style="list-style-type: none"> – Staff costs – Other maintenance costs – Other vendor costs – Staff time – Other improvement time – Vendor time 	<ul style="list-style-type: none"> • Time required for e-mail response to inquiry • Number of e-mail messages sent to agency and/or officials • Number of e-mail messages returned to them • Number of e-mail requests successfully resolved • Number of applications developed and implemented • Number of e-permits processed • Number of times various maps and mapping applications have been accessed • Number of e-commerce applications accessed • Number of license and other applications processed • Number of times multimedia presentations are played • Feedback on multimedia presentations • Number of times databases are accessed • Information in databases that is accessed most frequently 	<ul style="list-style-type: none"> • Level of citizen satisfaction with e-government services—measured by surveys • Usefulness of information—measured by surveys <p>Timeliness</p> <ul style="list-style-type: none"> • Response times to requests for information • Time required for e-mail response to inquiry <p>Service Quality</p> <ul style="list-style-type: none"> • Adoption rates within specified user groups • Number of referrals from other websites and government portals • For states and local governments, the number of agencies participating by providing information or services <p>Efficiency</p> <ul style="list-style-type: none"> • Cost of providing each service per user • Cost per service transaction <p>End Outcomes</p> <ul style="list-style-type: none"> • Cost savings from e-government • Staff time savings from e-government • Trust in government

Appendix: Methodology

The research in this report began by identifying information technology or e-government strategic plans on the information technology office websites of all the states and District of Columbia and on the sites of the 25 largest cities in the country. The U.S. Government e-government strategic plan was used to represent federal agencies since it included detailed information about agency efforts.

The assumption was that information technology professionals like those in these offices would have their plans posted on their websites if they existed at all; therefore, as a first step, sites were examined and searched to determine if the plans were available. If plans were not available, then the chief information officers of those jurisdictions (or their offices) were contacted in an attempt to obtain the plans.

Typically, most jurisdictions would have their performance measures within their strategic plan if they existed, since performance measures are typically part of the implementation and monitoring process of the strategic planning process. So the strategic plan was the first place to be examined for any measures. If they were not found there, annual reports, performance reports, or just performance brochures were also examined for any evidence of performance data.

Once strategic plans had been identified, the e-government relevant sections were identified of those that included both information technology and e-government. Then, the plans were carefully read and examined for any evidence of performance measures. They were found to exist if they were explicitly stated or if data were reported from which the existence of a performance measure could be inferred.

After a careful review of all the strategic plans and performance information found, best practice jurisdictions were identified based upon their record of performance measures and use of performance measurement methodologies. For these jurisdictions, interviews were conducted and documents were reviewed to develop the best practice case studies.

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