

Information Technology Procurement in Tennessee

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Key Points

- Many large information technology (IT) projects take longer than estimated to complete; many fail to meet their objectives. Federal agencies, states, and private sector organizations have responded to large project failure by proposing alternative planning and implementation procedures, including:
 - modular contracting,
 - partitioned procurement,
 - multi-stage procurement,
 - independent verification and validation, and
 - evidence-based reviews.
- The federal government recommends modular contracting for some large-scale IT projects. Modular contracting is a procurement approach that breaks down large projects into smaller separate projects. These separate projects are designed to interoperate within the larger system, resulting in shorter timeframes for completion. This approach is similar to best practices found in the private sector and in some areas of government. Tennessee's state agencies have the ability to use modular contracting under current laws and policies.
- Independent verification and validation (IV and V) is an effective method for reducing the risks associated with large-scale IT projects.
- Tennessee's "Information System Planning Process" is a comprehensive approach to the planning, initiation, review, and approval of technology projects within state agencies. In 2010, the Tennessee General Assembly passed Public Chapter 1098 to centralize procurement by creating four new organizations within state government intended to streamline the procurement and contracting process and to ensure transparency and accountability:
 1. Central Procurement Office
 2. Procurement Commission
 3. Advisory Council on State Procurement
 4. State Protest Committee
- Several models exist to improve overall project procurement and management practices and processes. These include the Information Technology Infrastructure Library (ITIL®), Control Objectives for Information and Related Technology (CobiT®), and Capability Maturity Model Integration (CMMI).

Background

States have a need to collect, input, organize, process, interpret, and summarize large amounts of data. This includes data about taxes, property, purchasing, social services applications, education, investments, and much more. Properly managing this data requires large, complex computer systems and software that will efficiently and accurately process information to allow the government to perform its many duties. U.S. federal and state governments, private corporations, and governments in other countries have encountered problems in procuring, implementing, and maintaining large computer systems.

One study compared the budgets and expected outcomes of 1,471 diverse projects with the actual costs and results. The authors concluded:

Our sample drew heavily on public agencies (92%) and U.S.-based projects (83%), but we found little difference between them and projects at the government agencies, private companies, and European organizations that made up the rest of our sample. When we broke down the projects' cost overruns, what we found surprised us. The average overrun was 27%—but that figure masks a far more alarming one. Graphing the projects' budget overruns reveals a “fat tail”—a large number of gigantic overages. Fully one in six of the projects we studied . . . [had] a cost overrun of 200%, on average, and a schedule overrun of almost 70%.¹

Agencies that have a need for large computer systems have responded to these process management problems by developing various procurement and implementation methodologies, including modular contracting, to allow focus on specific segments of projects. More generally, they have employed process improvement models such as the Information Technology Infrastructure Library, CobiT (Control Objectives for Information and Related Technology), and CMMI (Capability Maturity Model Integration). (See Appendix A.)

There have been large computer system successes. The U.S. Government Accountability Office examined seven successful federal IT programs and identified nine

common critical factors:²

1. Program officials were actively engaged with stakeholders.
2. Program staff had the necessary knowledge and skills.
3. Senior department and agency executives supported the programs.
4. End users and stakeholders were involved in the development of requirements.
5. End users participated in testing of system functionality prior to formal end user acceptance testing.
6. Government and contractor staff were consistent and stable.
7. Program staff prioritized requirements.
8. Program officials maintained regular communication with the prime contractor.
9. Programs received sufficient funding.

This legislative brief:

- Describes some of the risks and pitfalls involved in contracting for and implementing large computer systems;
- Describes alternative procurement models such as modular contracting, partitioned procurement, and multi-stage procurement to minimize the risks often found with large-scale IT projects; and
- Reviews Tennessee's processes for development, procurement, and implementation of IT projects.

OREA methodology for this report consisted of reviews of:

- Tennessee processes for IT project procurement and implementation;
- Tennessee state law and regulations concerning procurement;
- Risks and best practices for risk minimization;
- Procurement processes and experiences of other states;
- Procurement information on organization Web sites; and
- Literature relevant to IT procurement and contracting.

OREA also consulted with a number of departments and personnel involved in the procurement process,

including the Central Procurement Office within the Department of General Services, the Business Solutions Delivery unit within the Department of Finance and Administration, and the Office of Management Services within the Office of the Comptroller of the Treasury to understand and clarify the procurement process.

Large IT Project Risks and Solutions

Government agencies often apply a multi-year, large-scale approach to development, modernization, and investments in IT projects. As the implementation process lags, many agencies face concerns regarding the viability of the proposed solution, the financial risks associated with possible outdated solutions, or budgetary constraints that limit the ability to complete a multi-year project.³ After a review of 50 federal IT projects, the federal Office of Management and Budget (OMB) concluded: “One of the most consistent problems lies in project scope and timeline.”⁴ Federal contracting entities are currently required by OMB (Circular 130) to “[s]tructure major information systems into useful segments with a narrow scope and brief duration. This should reduce risk, promote flexibility and interoperability, increase accountability, and better match mission need with current technology and market conditions.”⁵

Many large IT projects take longer than estimated to complete; many fail to meet their objectives. Federal agencies, states, and private sector organizations have responded to large project failure by proposing alternative planning and implementation procedures, including:

- modular contracting,
- partitioned procurement,
- multi-stage procurement,
- independent verification and validation, and
- evidence-based reviews.

Modular Contracting

In 2010, the federal government released the *25 Point Implementation Plan to Reform Federal Information Technology Management* to address concerns related to large-scale IT projects. The report recommended modular contracting as a possible solution for approaching some large-scale IT projects at the federal level.⁶ Modular contracting is a procurement approach that breaks down large projects into smaller separate

Commonly cited reasons for IT project failures

1. Unclear, contradictory, ambiguous, or imprecise requirements
2. Lack of resources, resource conflicts, turnover of key resources, and poor planning
3. Schedules that are unrealistic, overly optimistic, or too tight
4. Poor planning based on insufficient data, missing items, insufficient details, or poor estimates
5. Unidentified or assumed risks that are not managed well

Source: PM Solutions Research, *Strategies for Project Recovery*, <http://www.pmsolutions.com/>, p.5.

projects.⁷ These separate projects are designed to interoperate within the larger system, resulting in shorter timeframes for completion. The agency can use one or more contracts with more than one vendor. This allows for flexibility when market or technical situations demand flexibility. It also allows modular or phased contracting to be identified within the scope of these contracts as deliverables. This approach is similar to those best practices found in the private sector and in some areas of government.⁸ Tennessee’s state agencies have the ability to use modular contracting under current laws and policies.⁹ The Director of the Business Solutions Delivery Division with the State of Tennessee indicated that modular contracting is now encouraged within state agencies, if appropriate, but there are no records to indicate whether or not agencies are currently using it as a model for their IT project implementations.¹⁰

The White House issued *Contracting Guidance to Support Modular Development* in June 2012 to further encourage the use of modular development in federal procurement.¹¹

By following a modular approach, agencies can recognize the following benefits:

- Delivery of usable capabilities that provide value to customers more rapidly as agency missions and priorities mature and evolve;
- Increased flexibility to adopt emerging technologies incrementally, reducing the risk of technological obsolescence;

- Decreased overall investment risk as agencies plan for smaller projects and increments versus “grand design” (each project has a greater overall likelihood of achieving cost, schedule, and performance goals than a larger, all-inclusive development effort);
- Creation of new opportunities for small businesses to compete for the work;
- Greater visibility of contractor performance. Tying award of contracts for subsequent task orders to the acceptable delivery of prior projects provides agencies better visibility of contractor performance and allows a greater opportunity to implement corrective actions without sacrificing an entire investment;
- An investment can be terminated with fewer “sunk” costs, i.e., costs that have already been incurred and cannot be recovered, capping the risk exposure to the agency when priorities change, a technology decision doesn’t work, or the contractor’s performance doesn’t deliver results.

According to the federal *Capital Programming Guide*: “Each module [of the project] must be an economically and programmatically viable (i.e., useful) segment” and “should include whatever design, development prototyping, testing, and production are necessary to obtain the identified functionality.” Modules may be successive or concurrent, depending on the needs of the project. Modules may represent an entire stage of a project or only a part of a stage. Modules must be able to work independently, while still being able to work effectively with other modules.¹² Federal law also urges modular contracting “to the maximum extent practicable” for federal procurement, and similarly urges time limitations for awarding contracts and performing contracted work.¹³ Federal Executive Order 13011 (1996) recommends modular contracting so that investments in major information systems are in “manageable projects as narrow in scope and brief in duration as practicable.”¹⁴ See Appendix B for federal laws pertaining to modular contracting.

The Virginia Corrections Information System (VirginiaCORIS) began in November 2004 as an effort to address issues associated with the dozens of obsolete computer systems and databases used to process individuals in the Department of Corrections. Virginia used the modular contracting approach to integrate and connect departments that had previously been unable to easily share information with one another. Since its inception, the Virginia Department of Corrections has added 14 major modules to the application, allowing the Department of Corrections to quickly and easily share information with the Virginia State Police, local law enforcement, the Attorney General’s Office, and local jails. As a result of this project, the state is better able to address public safety concerns, improve financial efficiencies, and collect and store more relevant data to share between agencies.¹⁵

Partitioned Procurement

Partitioned procurement is a procurement model similar to modular contracting. In this process, the agency specifies its overall requirements and separates them into several subprojects. Each subproject operates within its own budget limitations of typically no more than \$1 million, and each subproject is individually procured. The agency forms an “integration project” to supervise the subprojects. When a subproject is delivered and passes integration testing, it becomes part of the project framework. One of the goals of partitioned procurement is independent functioning of subprojects.¹⁶

Before attempting to implement partitioned procurement, procurement specialists may require additional education and training regarding how to properly divide the larger project into smaller projects. Partitioned procurement can improve success rates and reduce costs by isolating risks typically associated with

Partitioned procurement does not reduce the amount of functionality in the final delivered system. It just breaks that functionality down into manageable, self-contained, autonomous units of work.

Source: Revamping Public Sector IT Procurement to Favor Success and Small Business by Roger Sessions, ObjectWatch, Inc., used with permission of CUEC and Roger Sessions. <http://www.objectwatch.com/whitepapers/CUEC-PP-001-001.pdf>.

large-scale projects. It can also provide opportunities to participate in the bidding process to smaller businesses that may not have been able to participate in a multi-million dollar project scope.¹⁷

Multi-Stage Procurement

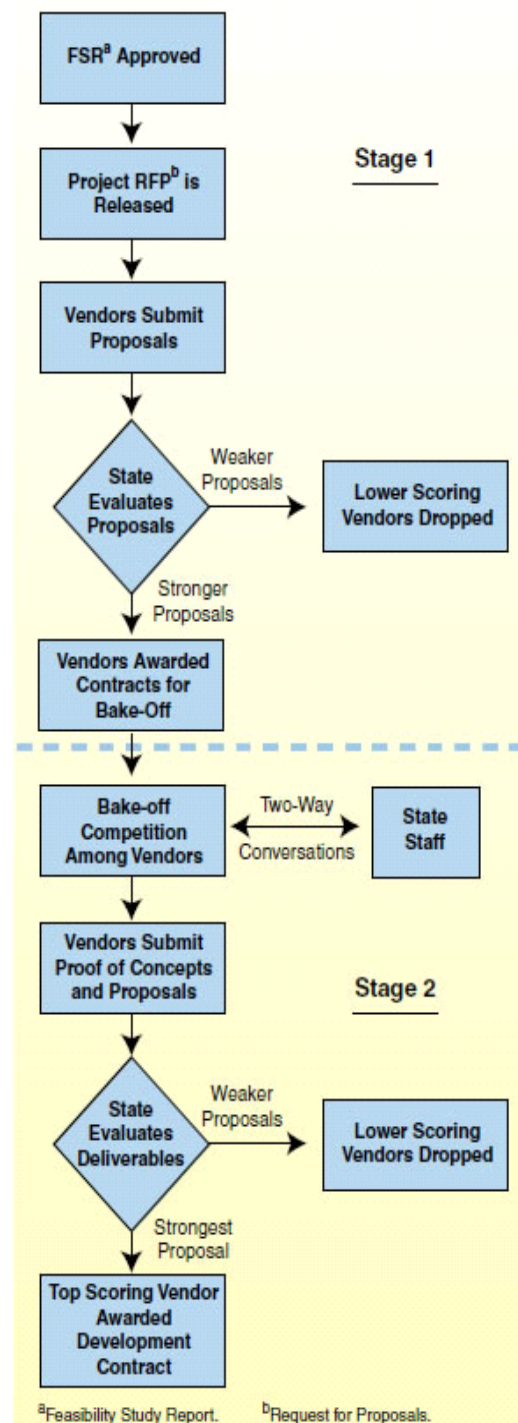
Another alternative to the traditional large-scale project approach is multi-stage procurement. California, whose RFP process resembles Tennessee's, uses this approach for complicated IT projects. Multi-stage procurement divides a single procurement into multiple stages. (See Exhibit 1.) In the first stage, the state issues an RFP to interested vendors, similar to the traditional approach. Rather than contract with a single vendor, however, the state will enter into contracts with two or more vendors, with the costs agreed upon in the initial RFP process. Each of these vendors will compete against one another to build a prototype of the requested IT solution. This process, referred to as the "proof of concept" stage, allows the businesses to demonstrate their understanding of the state's business goals with the proposed project as well as to convince the agency that their company's prototype is the best solution. At this time, each company must also submit a proposal for developing the entire system.¹⁸ This process is also one of several options recommended by the *Capital Programming Guide* from the U.S. OMB.¹⁹

Multi-stage procurement allows for several advantages not always evident in large-scale procurement projects:²⁰

- More vendors are more likely and able to participate when they receive payment upfront for start-up costs to a project. Greater participation results in more competition and reduced costs for the state.
- Only the most qualified vendors will apply and meet the requirements necessary to continue to phase 2 of the prototype process, reducing the time and effort required by agency staff to evaluate unqualified applicants during the RFP review process.
- Interaction between the competing companies and the state agency allows for more open communication and evaluation of the project between all parties, allowing agency staff to better understand and evaluate the concerns and questions raised by each of the vendors.

Risks associated with multi-stage procurement include longer procurement schedules due to a lengthier time requirement during the initial RFP process, more upfront costs for the state because of contracts with multiple vendors, issues related to staff oversight of multiple vendors, and the potential for vendor(s) to withdraw during the prototype stage, resulting in a loss of competition and options.²¹

Exhibit 1: Major Steps in Multi-Stage Procurement



Source: Mac Taylor, *Try Before You Buy: Expanding Multi-Stage Procurements for Large IT Systems*, Nov. 11, 2009, p. 11, <http://www.lao.ca.gov/>.

Assessing IT Projects During and After Implementation

Independent Verification and Validation

The U.S. Government Accountability Office (GAO) has recommended the use of independent verification and validation (IV and V) as an effective method in reducing the risks associated with large-scale IT projects. IV and V is a set of procedures performed by a third party to ensure that a project proceeds correctly through each stage by identifying possible risks at the beginning of a project and mitigating them as the project moves toward completion. The independent evaluator also assists in determining that the project will do what it is intended to do and will meet the users' needs. A study conducted by the Institute of Electrical and Electronics Engineers found the methodology allowed more problems to be identified sooner, shortened the time it took to fix problems, and improved operations. The GAO stresses that for independent verification and validation to be successful, the third party performing the review must have full technical, managerial, and financial independence.²²

Evidence-based Reviews

In 2010, the federal government introduced TechStat, an evidence-based review of underperforming IT investments. Using information available through the IT Dashboard – a federal government website that displays the cost, schedule, and Chief Information Officer's (CIO) rating of federal IT projects, as well as other performance data²³ – TechStat sessions are convened when the agency needs to develop an action plan to turnaround or halt a troubled or failing IT project. These meetings include the agency's CIO and other members of the agency's leadership team.²⁴

According to a July 2010 GAO report based on data from the Federal IT Dashboard, hundreds of projects costing millions of dollars were on the U.S. Office of Management and Budget's (OMB) Management Watch List as "high-risk projects."²⁵ See Appendix C for evaluation criteria used by federal agency CIOs to assess federal IT projects.

The OMB provides the interface for agency CIOs to enter evaluation information on variables into the system using criteria in the following general areas: risk management, requirements management, contractor oversight, historical performance, and human capital.²⁶

Exhibit 2: Organizations Responsible for the Information System Planning Process



Source: State of Tennessee, Information Systems Statewide Plan 2011-2012, Jan. 2012, p.10.

IT Projects: From Agency Conception to State Approval

The following section outlines the sequence of steps in the life of an IT project.^{27,28}

1. Prior to the beginning of the fiscal year, each state agency reviews its short-term and long-term technology goals. The agency develops its Information Systems Plan (ISP), documenting short-term, three-year goals pertaining to information technology projects in the current year, future fiscal requests, and upcoming projects.²⁹ The agency also develops an Information Technology Strategy (ITS) to address short-term and long-term

goals related to managing and sharing information and how information technology will support the agency's business strategic plan.

2. The agency drafts a Preliminary Project Proposal (PPP) for information technology projects documented in the ISP that support the agency's ITS. The PPP contains the business case for the project, an estimated cost, and funding sources.
3. ISPs and PPPs are submitted for review to the agency's Management Advisory Committee (MAC) to ensure the project aligns with the agency's mission, business goals, and IT goals. MACs are responsible for:
 - a. Setting the information technology agenda as an adjunct to the development of the business strategy for the agency.
 - b. Ensuring that the agency information technology strategy is carried out and that projects are appropriately targeted to support specific business strategies.
 - c. Reviewing the cost assumptions and benefit estimates in order to approve submission of the project.
 - d. Setting priorities within the agency for a project in relation to other projects competing for resources.
 - e. Ensuring that authorized projects meet targets established in the project proposal and cost benefit analysis.
 - f. Ensuring that technology projects are in line with business needs and direction.
 - g. Authorizing the Information Systems Plan and the technology projects contained therein.
4. The MAC submits the agency's ITS and ISP to the Information Technology Assessment and Budget Review Committee (IT-ABC). This committee is composed of members of the Office of Information Resources and the State Budget Office, both located within the Department of Finance and Administration. The IT-ABC reviews submissions from every state agency and is responsible for addressing information systems issues at a statewide level.
5. The IT-ABC issues a formal memo in response to each agency's submission, noting areas of concern as well as approval or disapproval of the project. It then meets with each agency's MAC and IS staff to address issues identified.
6. Statewide agency initiatives are submitted to the Information Systems Council (ISC). The ISC's statutorily assigned duties and responsibilities (found at T.C.A. 4-3-5502) include developing policy guidelines for the overall management of the state's information systems and periodically reviewing the management of the state's information systems network.³⁰ While much of the individual project review process is delegated to the IT-ABC, the ISC receives quarterly status reports on all systems initiatives within state agencies that have an initial cost of \$10 million or more.

Request for Proposal and Procurement Process

Once the agency's Information Systems Plan and associated projects are approved by the IT-ABC, other steps in the process begin – these steps are taken from a book titled *A Guide to Project Management Body of Knowledge*, or PMBOK®,³¹ a guide to managing projects produced by the Project Management Institute (PMI). The phases are initiation, planning, development, and implementation. A process within the planning phase includes a project deliverable called the scope and feasibility study. This document assists in identifying the feasibility of either in-house resource development of code and databases for a system or procurement of those services or procurement of a product in the market. Generally, these projects require some form of procurement of goods or services.

Prior to 2010, the procurement process was divided into two separate paths, depending on whether an agency was procuring goods or services. Services were procured through the Department of Finance and Administration, and goods were procured through the Department of General Services. A 2006 report from the Department of Finance and Administration concluded that under the current procurement structure, the lack of a single entity to oversee or to be held accountable for statewide procurement spending resulted in difficulty managing the statewide process for procurement. The

report also specified additional problems with the procurement process:³²

- Difficulty vendors have doing business with the state;
- Inefficient or redundant processes;
- Lack of policy compliance;
- Minimal vendor diversity; and
- Lack of accountability.

In August 2009, the Comptroller's Office and Fiscal Review Committee staff formed a Procurement Oversight Workgroup. This group recommended changes to the law to centralize procurement of goods and services and address problems noted in the 2006 report.³³ In 2010, the General Assembly passed Public Chapter 1098 to centralize procurement, addressing many of the concerns raised by the Procurement Oversight Workgroup.³⁴ PC 1098 (2010) created four new organizations within state government intended to streamline the procurement and contracting process and to ensure transparency and accountability:^{35,36}

1. Central Procurement Office,
2. Procurement Commission,
3. Advisory Council on State Procurement, and
4. State Protest Committee

Central Procurement Office

The Central Procurement Office in the Department of General Services is responsible for state procurement of both goods and services. The office is headed by the Chief Procurement Officer,³⁷ appointed by the governor, and is charged with developing centralized processes for:

- procurement,
- grant management,
- performance and quality assurance,
- bidder relations, and
- professional development and staff training.³⁸

Procurement Commission

The Procurement Commission is responsible for reviewing recommendations by the Chief Procurement Office for approval of Rules and Regulations, Policies and Procedures and Guidelines for all state agencies governing the processes identified above.³⁹

Advisory Council on State Procurement

The Advisory Council on State Procurement is

responsible for making recommendations to improve the state's procurement process and related issues.⁴⁰

Although it functions in an advisory role, the Council may also conduct studies, research, and analyses, as well as issue reports and recommendations related to the laws or rules pertaining to procurement. The Council is also responsible for monitoring the performance of the Central Procurement Office regarding the implementation of legislative directives and reviewing bills introduced to the General Assembly pertaining to public procurement or contract laws.⁴¹

State Protest Committee

The committee consists of the Commissioners of Finance and Administration, the Commissioner of General Services, and the State Treasurer. Its purpose is to hear any appeals of the Chief Procurement Officer's rulings concerning bid protests.⁴²

Summary of the RFP Process in Tennessee

The state uses a competitive sealed bid process that includes issuing requests for proposals, or RFPs. The state has several standard Service Contracting Model templates and commodity solicitations available for agencies to use when drafting documents necessary to establish commodity and professional service contracts.⁴³ While the templates provide guidance to the RFP process, the procuring agency must specify in detail the services and schedules it requires.⁴⁴ Every agency is required to appoint a Service Contract Coordinator to oversee the RFP process for that agency⁴⁵ or the Central Procurement Office may choose to provide an RFP coordinator for the agency.⁴⁶

Once an agency completes the RFP draft, the proposed RFP is sent to the Central Procurement Office (CPO). The CPO, with approval by the Comptroller, may delegate its approval authority to an agency. The agency is responsible for amending the RFP draft in response to comments made by the CPO and any other approver in the process, and the agency is notified when the RFP is approved for release.

Once an RFP is released for bid, an evaluation team of three or more state employees appointed by the procuring agency is responsible for reviewing the proposals received. Proposals are evaluated based on the following guidelines:⁴⁷

1. Mandatory requirements (these minimum requirements for responsiveness may not be arbitrary);
2. General qualifications and experience (i.e., organization background, resources, proposer background with the subject service, key staff experience, and past work performed for the state and other clients);
3. Technical approach (i.e., project understanding, approach, and management); and
4. Cost.

Procurement Implementation

The Business Solutions Delivery Division in the Department of Finance and Administration is charged with helping to minimize problems in planning and implementing large systems projects. The division addresses projects estimated to cost \$10 million and greater, or projects judged to be high risk.⁴⁸ The division uses a business process analysis methodology to examine business objectives, review current business processes, make recommendations for change, and help implement and manage change.⁴⁹ (See Appendix D.) The Commissioner, Deputy Commissioner, and the Chief Information Officer select projects for the division's focus.⁵⁰

Tennessee IT Project Management Methodology

The State of Tennessee has an *IT Project Management Methodology* based on *A Guide to Project Management Body of Knowledge*, or PMBOK®,⁵¹ a guide to managing projects produced by the Project Management Institute (PMI).⁵² The comprehensive methodology, called the Tennessee Business Solutions Methodology (TBSM), describes “the framework that is used by the State of Tennessee in initiating, planning, managing (executing and controlling), and closing Information Technology (IT) projects.”⁵³

- ¹ Brent Flyvbjerg and Alexander Budzier, "Why Your IT Project May Be Riskier Than You Think," *Harvard Business Review*, Sept. 2011, p.3, <http://www.sbs.ox.ac.uk/> (accessed Oct. 16, 2012).
- ² U.S. Government Accountability Office, *Information Technology: Critical Factors Underlying Successful Major Acquisitions*, October 2011, p. 19, <http://www.gao.gov/> (accessed Aug. 7, 2012).
- ³ U.S. Office of Management and Budget, *Contracting Guidance to Support Modular Development*, June 14, 2012, p.3, <http://www.whitehouse.gov/> (accessed Aug. 29, 2012).
- ⁴ Vivik Kundra, U.S. Chief Information Officer, *25 Point Implementation Plan to Reform Federal Information Technology Management*, Dec. 9, 2010, p. 11, <https://cio.gov/> (accessed Oct. 4, 2012).
- ⁵ U.S. Office of Management and Budget, *Circular No. A-130 Revised*, Section 8(4), <http://www.whitehouse.gov/> (accessed October 4, 2012).
- ⁶ Vivik Kundra, U.S. Chief Information Officer, *25 Point Implementation Plan to Reform Federal Information Technology Management*, p. 11, <https://cio.gov/> (accessed October 4, 2012).
- ⁷ U.S. Office of Management and Budget, *Contracting Guidance to Support Modular Development*, p.4 and 10, <http://www.whitehouse.gov/> (accessed August 29, 2012).
- ⁸ Vivik Kundra, U.S. Chief Information Officer, *25 Point Implementation Plan to Reform Federal Information Technology Management*, Dec. 9, 2010, p.11, <https://cio.gov/> (accessed Oct. 4, 2012).
- ⁹ Jessica Robertson, Chief Procurement Officer, Central Procurement Office, Department of General Services, interview, Jan. 10, 2013.
- ¹⁰ Stephanie Dedmon, Director, Business Solutions Delivery, e-mail, March 14, 2013.
- ¹¹ U.S. Office of Management and Budget, *Contracting Guidance to Support Modular Development*, p.4, <http://www.whitehouse.gov/> (accessed Aug. 29, 2012).
- ¹² U.S. Office of Management and Budget, *Capital Programming Guide*, V 3.0: Supplement to Office of Management and Budget Circular A-11 – Planning, Budgeting and Acquisition of Capital Assets, July 2012, p. 31, <http://www.whitehouse.gov/> (accessed Aug. 29, 2012).
- ¹³ *Clinger-Cohen Act of 1996*, Public Law 104-106, Title LII, Section 5202, <http://www.gpo.gov/> (accessed Dec. 4, 2012).
- ¹⁴ William J. Clinton, President of the U.S., Executive Order 13011, issued July 16, 1996, *Section 2(e) Federal Information Technology*, <http://govinfo.library.unt.edu/> (accessed April 19, 2013).
- ¹⁵ National Association of State Chief Information Officers, "The Virginia Corrections Information System (VirginiaCORIS)," 2012, p.1, <http://www.nascio.org/> (accessed Oct. 18, 2012).
- ¹⁶ Roger Sessions, *Revamping Public Sector IT Procurement to Favor Success and Small Business*, Jan. 19, 2011, p. 5, <http://www.cuec.info/> (accessed Oct. 18, 2012).
- ¹⁷ Roger Sessions, *Revamping Public Sector IT Procurement to Favor Success and Small Business*, Jan. 19, 2011, pp. 7-9, <http://www.cuec.info/> (accessed Oct. 18, 2012).
- ¹⁸ Mac Taylor, *Try Before You Buy: Expanding Multi-Stage Procurements for Large IT Systems*, Nov. 11, 2009, p. 1-16, <http://www.lao.ca.gov/> (accessed Aug. 28, 2012).
- ¹⁹ U.S. Office of Management and Budget, *Capital Programming Guide*, V 3.0: Supplement to Office of Management and Budget Circular A-11 – Planning, Budgeting and Acquisition of Capital Assets, July 2012, p. 33, <http://www.whitehouse.gov/> (accessed Aug. 29, 2012).
- ²⁰ Mac Taylor, *Try Before You Buy: Expanding Multi-Stage Procurements for Large IT Systems*, Nov. 11, 2009, p. 10, <http://www.lao.ca.gov/> (accessed Aug. 28, 2012).
- ²¹ *Ibid.*
- ²² U.S. Government Accountability Office, *Information Technology: DHS Needs to Improve Its Independent Acquisition Reviews*, GAO-11-581, July 2011, pp. 10 and 12, <http://www.gao.gov/> (accessed Aug. 14, 2012).
- ²³ Federal IT Dashboard, FY 2014 Edition, <http://www.itdashboard.gov/> (accessed Aug. 29, 2012).
- ²⁴ CIO.gov, "What is TechStat?," <http://www.cio.gov/> (accessed Aug. 29, 2012).
- ²⁵ U.S. Government Accountability Office, *Information Technology: OMB's Dashboard Has Increased Transparency and Oversight, but Improvements Needed*, July 2010, p.5 <http://www.gao.gov/> (accessed Oct. 2012).
- ²⁶ Federal IT Dashboard, "IT Dashboard FAQ," <http://www.itdashboard.gov/> (accessed March 13, 2013).
- ²⁷ State of Tennessee, *Information Systems Planning Process*, June 2007, <http://www.tn.gov/> (accessed April 19, 2013).
- ²⁸ Jamie Etheridge, Deputy Chief Information Officer, Office for Information Resources, e-mail, May 9, 2013.
- ²⁹ The Office for Information Resources (OIR) is responsible for establishing and implementing a planning process, which must be approved by the Information Systems Council (ISC) and which agencies must follow.
- ³⁰ ISC statutory responsibilities, such as the establishment of effective long-range planning for the state's information management system, were not affected by the changes made under PC1098.

- ³¹ State of Tennessee, *IT Project Management Methodology*, April 24, 2007, pp.5-6.
- ³² Comptroller of the Treasury, "Consolidation of Procurement and Contract Processes HB3353/SB3598," Consolidation of Procurement and Contract Processes HB3353/SB3598, pp. 5 and 9, Presented to House State and Local Government Committee, April 20, 2010.
- ³³ *Ibid.*
- ³⁴ 106th Tennessee General Assembly, [Public Acts, 2010, Chapter No. 1098](#), An act relative to the State Procurement Commission, <http://state.tn.us/sos/> (accessed March 26, 2013).
- ³⁵ Tennessee Department of General Services, "Procurement Reform," not dated, <http://tn.gov/> (accessed Sept. 7, 2012).
- ³⁶ *Ibid.*
- ³⁷ *Tennessee Code Annotated* 4-56-104.
- ³⁸ *Tennessee Code Annotated* 4-56-105 (c-t).
- ³⁹ *Tennessee Code Annotated* 4-56-102(b)(1); Melinda Parton, Director of Management Services, Comptroller of the Treasury, e-mail attachment, June 13, 2013.
- ⁴⁰ *Tennessee Code Annotated* 4-56-106(g).
- ⁴¹ *Tennessee Code Annotated* 4-56-106(j).
- ⁴² *Tennessee Code Annotated* 4-56-103.
- ⁴³ State of Tennessee, Department of General Services, [Professional Service Contracting Models](#), <http://tn.gov/> (accessed April 17, 2013).
- ⁴⁴ State of Tennessee, Central Procurement Office, [Professional Service Contracting Policy, Section 03a-3a](#), <http://tn.gov/> (accessed Aug. 27, 2012).
- ⁴⁵ State of Tennessee, Central Procurement Office, [Professional Service Contracting Policy, Section 02d](#), <http://tn.gov/> (accessed Aug. 27, 2012).
- ⁴⁶ Mary Anne Queen, Legislative Sourcing Oversight Manager, Office of Management Services, Comptroller of the Treasury, e-mail, March 19, 2013.
- ⁴⁷ State of Tennessee, Central Procurement Office, [Professional Service Contracting Policy, Section 03a-3a](#), <http://tn.gov/> (accessed Aug. 27, 2012).
- ⁴⁸ Business Solutions Delivery, Presentation to Information Systems Council, pp.3 and 6.
- ⁴⁹ Business Solutions Delivery, "Business Process Analysis – The Key to Success," June 18, 2012, p. 5; Stephanie Dedmon, Department of Finance and Administration, e-mail, May 10, 2013.
- ⁵⁰ Stephanie Dedmon, Director, Business Solutions Delivery, e-mail, March 14, 2013.
- ⁵¹ State of Tennessee, *IT Project Management Methodology*, April 24, 2007, pp.5-6.
- ⁵² Program Management Institute, "Library of PMI Global Standards," <http://www.pmi.org/> (accessed Sept. 7, 2012).
- ⁵³ State of Tennessee, *IT Project Management Methodology*, April 24, 2007, p. 5; Stephanie Dedmon, Director, Business Solutions Delivery, e-mail, May 10, 2013.

Appendix A: Process Improvement Models

Information Technology Infrastructure Library (ITIL®)

ITIL® is a process improvement model originally developed by the British government to ensure best practices and comparable services across government agencies. It is a comprehensive methodology for continuously improving management of IT services, consisting of five publications that guide professionals through the life cycle of an IT project, from conception of the project to a continual improvement of the services.

CobiT®

Control Objectives for Information and Related Technology (CobiT®) is a system for IT project management developed by ISACA (formerly known as the Information Systems Audit and Control Association) and IT Governance Institute. As described by ISACA:

COBIT 5 is based on five key principles for governance and management of enterprise IT:

- Principle 1: Meeting Stakeholder Needs
- Principle 2: Covering the Enterprise End-to-End
- Principle 3: Applying a Single, Integrated Framework
- Principle 4: Enabling a Holistic Approach
- Principle 5: Separating Governance From Management

CMMI (Capability Maturity Model Integration)

The Capability Maturity Model Integration, created by the Software Engineering Institute at Carnegie-Mellon University, is a collection of process improvement models organizations may use to address issues and procedural concerns. Each model focuses on a certain aspect of service and business objectives; however, the models complement one another and organizations may find a need for more than one model. CMMI models address issues such as supply chain management, product development, service delivery, and workforce management and development.

Sources:

ITIL, "What is ITIL?," <http://www.itil.org/> (accessed April 19, 2013).

ISACA, "COBIT 5: A Business Framework for the Governance and Management of Enterprise IT," <http://www.isaca.org/> (accessed Aug. 22, 2012).

CMMI Institute, "Solutions," <http://cmminstitute.com/> (accessed April 11, 2013).

Appendix B: Federal laws concerning modular contracting

Federal agencies are urged to use modular contracting, when possible:

SEC. 35. MODULAR CONTRACTING FOR INFORMATION TECHNOLOGY.

(a) IN GENERAL- The head of an executive agency should, to the maximum extent practicable, use modular contracting for an acquisition of a major system of information technology. (b) MODULAR CONTRACTING DESCRIBED- Under modular contracting, an executive agency's need for a system is satisfied in successive acquisitions of interoperable increments. Each increment complies with common or commercially accepted standards applicable to information technology so that the increments are compatible with other increments of information technology comprising the system.

Federal Executive Order 13011 (1996) also recommends modular contracting

where appropriate, and in accordance with the Federal Acquisition Regulation and guidance to be issued by the Office of Management and Budget (OMB), structure major information systems investments into manageable projects as narrow in scope and brief in duration as practicable,, to reduce risk, promote flexibility and interoperability, increase accountability, and better correlate mission need with current technology and market conditions;

Federal law further urges time limitations for awarding the contract and the period of time the work should take place:

To avoid obsolescence, a modular contract for information technology should, to the maximum extent practicable, be awarded within 180 days after the date on which the solicitation is issued. If award cannot be made within 180 days, agencies should consider cancellation of the solicitation in accordance with 48 CFR 14.209 or 15.206(e). To the maximum extent practicable, deliveries under the contract should be scheduled to occur within 18 months after issuance of the solicitation.

Sources:

Clinger-Cohen Act of 1996, Public Law 104-106, Title LII, Section 5202, <http://www.gpo.gov/> (accessed Dec. 4, 2012).

William J. Clinton, President of the U.S., "Executive Order 13011, Section 2(e) Federal Information Technology," July 16, 1996, <http://govinfo.library.unt.edu/> (accessed April 19, 2013).

Federal Acquisition Regulations System, *Title 48 Code of Federal Regulations* 39.103(e) Modular Contracting, <http://www.ecfr.gov/> (accessed Oct. 18, 2012).

Appendix C: Evaluation criteria used by federal agency CIOs to assess federal IT projects

Evaluation Factor	Supporting Examples
Risk Management	<ul style="list-style-type: none"> ▫ Risk Management Strategy Exists ▫ Risks are well understood by senior leadership ▫ Risk log is current and complete ▫ Risks are clearly prioritized ▫ Mitigation plans are in place to address risks
Requirements Management	<ul style="list-style-type: none"> ▫ Investment objectives are clear and scope is controlled ▫ Requirements are complete, clear and validated ▫ Appropriate stakeholders are involved in requirements definition
Contractor Oversight	<ul style="list-style-type: none"> ▫ Acquisition strategy is defined and managed via an Integrated Program Team ▫ Agency receives key reports, such as earned value reports, current status, and risk logs ▫ Agency is providing appropriate management of contractors such that the government is monitoring, controlling, and mitigating the impact of any adverse contract performance
Historical Performance	<ul style="list-style-type: none"> ▫ No significant deviations from planned cost and schedule ▫ Lessons learned and best practices are incorporated and adopted
Human Capital	<ul style="list-style-type: none"> ▫ Qualified management and execution team for the IT investments and/or contracts supporting the investment ▫ Low turnover rate
Other	<ul style="list-style-type: none"> ▫ Other factors that the CIO deems important to forecasting future success

In federal fiscal year 2013:

- 9.9 percent (240) of federal government major IT projects were rated as having significant concerns
- 10.81 percent (262) of projects were rated as needs attention for project cost
- Approximately 15 percent (368) of projects were rated with significant concerns
- 7.9 percent (192) of projects rated Needs Attention concerning project schedule

Sources:

Federal IT Dashboard, 2014 Edition, "IT Dashboard FAQ," <http://www.itdashboard.gov/faq> (accessed April 19, 2013).

Federal IT Dashboard, 2014 Edition, "Portfolios," <http://www.itdashboard.gov/portfolios> (accessed Oct. 16, 2012).

Appendix D: Tennessee Business Solutions Methodology



Tennessee Business Solutions Methodology

Legend



Notes: Project phases may run in parallel and are not necessarily in a linear fashion. The order of boxes in each phase is not meant to imply the sequence of tasks.
PM=Project Management; BA=Business Analysis.

Source: TSBM Model Project Approach.



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