

National Archives and Records Administration

E-Gov Electronic Records Management Initiative

**RECOMMENDED PRACTICE: Analysis of Lessons Learned for
Enterprise-wide ERM Projects**

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Recommended Practice: Analysis of Lessons Learned for Enterprise-wide ERM Projects

Electronic records management (ERM) systems provide mechanisms to manage agency records, as required by law, throughout their life cycle (from creation, through maintenance and use, and ultimate disposition). An enterprise-wide strategy to manage and exploit the information and knowledge assets of an agency is recommended. Deploying an enterprise-wide system poses many challenges, but the benefits to the agency, its staff, and users far outweigh the difficulties faced by ERM project teams. Coordinated document, records, information, and knowledge management strategies will enable agencies “to adapt to the demands of an evolving business environment” (Electronic Records Policy Working Group, 2004, p. 3). Careful planning and a degree of flexibility on the part of agency staff can ease the transition as processes are modified to accommodate the new system.

This document analyzes the experience of managers who have been involved in ERM projects, summarizing their accumulated knowledge of factors that can promote successful implementation and identifying the barriers that can impede the progress of enterprise-wide installation. Highlights of the many lessons learned have been summarized in two phases (Project planning and Implementation) and duties specific to records managers are presented in **Figure 1**.

Figure 1. A Summary of Lessons Learned from ERM Projects

Project planning phase
Secure management leadership, endorsement, and support for your enterprise-wide ERM initiative
Align project with management's expectations and organization's willingness to change
Commit the agency from the outset to the reengineering and standardization of business processes
Ensure sufficient resources to develop underlying processes, policies, and procedures
Evaluate systems with respect to existing enterprise architecture, existing information infrastructure, and anticipated advancements in technology
Devise and adhere to realistic schedules for each phase of the project (Determining agency-specific requirements; Evaluating COTS projects; Pilot testing; Implementation/rollout to agency)
Develop and implement a communications plan that keeps the team aware of project details (e.g., changes in procedure) and informs agency staff of progress being made on the project, especially if this work is not yet evident agency-wide
Contract directly with software vendors and make sure that functional requirements are conveyed to them
Implementation phase
Design role-specific training for project team members
Develop and deploy fully-funded modules (e.g., not implementing all features at the outset, but over time), including a phased rollout of the system (extending the implementation other document types, programs, departments, and office locations)
Minimize mapped data between document and records management software packages
Test for user acceptance throughout the process
Integrate ERM with other systems (information management, knowledge management, electronic document management, and other enterprise systems)
Records management-specific duties
Simplify and standardize your agency file plan/file structure, metadata specification, and naming conventions as part of your advance preparation.
As much as possible, ensure consistency of indexing agency-wide so that records of individual programs will migrate easily from legacy systems
Consolidate the electronic filing function to reduce cost of software ownership, improve filing

consistency, and reduce amount of training needed
Minimize mapped data between document and records management software packages
Ensure adequate records management reporting to perform dispositioning

The guidance document is composed of six sections, followed by an Appendix:

1. Introduction
2. Application of this Guidance Document
3. Lessons Learned from ERM Project Implementation
 - 3.1 Capital Planning and Investment Control (CPIC)
 - 3.2 Determining Agency-unique Requirements for Enterprise-wide ERM Initiatives
 - 3.3 Evaluation of Commercial Off-the-Shelf (COTS) software
 - 3.4 Governance Structure
 - 3.5 Developing and Implementing an ERM Proof of Concept Pilot
4. Critical Components and Success Factors for ERM Implementation
5. Strategies for Minimizing Barriers to Agency-wide Implementation of ERM
6. Summary

Appendix: Resources for Creating an ERM Lessons Learned Knowledge Center

1. Introduction

The strategic focus of the Office of Management and Budget's (OMB) Electronic Government (E-Gov) Initiatives is to utilize commercial best practices in key government operations. The National Archives and Records Administration (NARA) is the managing partner for the ERM E-Gov Initiative. The ERM Initiative provides a policy framework and guidance for electronic records management applicable government-wide. It is intended to promote effective management and access to federal agency information to assist accelerated decision-making.

This guidance document is one of a suite of advisory documents to be produced under NARA's ERM Initiative that, when taken together, form the policy principles to a level of uniform maturity in both the federal government's management of its electronic records and its ability to transfer electronic records to NARA.

This is the sixth document produced under the Enterprise-wide ERM Issue Area. The previous five guidance documents are:

- *Coordinating the Evaluation of Capital Planning and Investment Control (CPIC) Proposals for ERM Applications* (<http://www.archives.gov/records-mgmt/policy/cpic-guidance.html>) highlights the importance of identifying CPIC proposals with ERM components (i.e., requirements or functionality) and determining how best to fund those projects
- *Electronic Records Management Guidance on Methodology for Determining Agency-unique Requirements* (<http://www.archives.gov/records-mgmt/policy/requirements-guidance.html>) offers a process for identifying potential ERM system requirements that are not included in the Design Criteria Standard for Electronic Records Management Applications, DOD 5015.2-STD (v.2)

- *Guidance for Evaluating Commercial Off-the-Shelf (COTS) Electronic Records Management (ERM) Applications* (<http://www.archives.gov/records-mgmt/policy/cots-eval-guidance.html>) summarizes the Environmental Protection Agency's (EPA) experience identifying the COTS products that would best meet the needs of agency staff for both Electronic Document Management (EDM) and Electronic Records Management (ERM) functionality
- *Guidance for Building an Effective Enterprise-wide Electronic Records Management (ERM) Governance Structure* (<http://www.archives.gov/records-mgmt/policy/governance-guidance.html>) defines governance and its importance to the success of IT projects, the purpose and function of that governance, how project-specific governance (such as those instituted for enterprise-wide ERM) fits within and alongside other established governance structures, and the risks attendant in the absence of good governance
- *Guidance for Developing and Implementing an Enterprise-wide Electronic Records Management (ERM) Proof of Concept Pilot* (<http://www.archives.gov/records-mgmt/initiatives/enterprise-erm.html>) applies the principles and "best practices" of IT project management to a proof of concept demonstration pilot for ERM designed to assess whether to deploy the system agency-wide.

The guidance documents are intended to help federal agencies understand the technology and policy issues associated with procuring and deploying an enterprise-wide ERM system.

2. Application of this Guidance Document

As agencies embark on enterprise-wide ERM initiatives, their understanding of how best to prepare federal agency staff for the transition, participate in the design and development of the ERM system, and continue to improve the system once deployed provide valuable knowledge that can help others speed the process and avoid some of the pitfalls encountered during other installations. This guidance presents lessons learned from a variety of ERM initiatives, with special emphasis on the criteria that make an ERM deployment successful in federal agencies and the barriers likely to be encountered along the way. Agencies are reminded that OMB policies in [OMB Circular A-11](#) Part 7, Planning, Budgeting, Acquisition, and Management of Capital Assets and [OMB Circular A-130](#), Management of Federal Information Resources apply to the planning for and selecting an ERM system and that the Federal Acquisition Regulations (FAR) apply to acquisition of ERM software.

The primary audiences for this document are federal agency staff involved with the planning or conduct of an ERM project, including records managers, security officers, IT personnel (including network managers, data and database administrators, and security engineers), trainers, and end-user participants. It also will help vendors (whose systems are used in agency ERM installations) understand how they can better serve their government clients and ease the process of enterprise-wide implementation.

3. Lessons Learned from ERM Project Implementation

To better understand how and under what conditions enterprise-wide ERM projects thrive, the lessons learned from federal and state agency ERM project managers have been grouped into five categories:

Strategy Lessons revolve around the need to understand existing workflow and business processes before designing plans for improvement; thorough project planning that

envisions a phased approach to enterprise-wide ERM deployment; and aligning performance outcomes with the business vision and mission of your agency, including frequent communication regarding the ERM project and how it will advance the agency's goals and objectives. Analysis, simplification, and standardization of workflow and business practices are key elements for a successful ERM deployment.

Organization Lessons involve the process of readying agency staff for the changes that will necessarily accompany the introduction of ERM. Agencies must understand how the ERM system will affect the work of its staff and a plan must be developed to ease the transition. In order to successfully implement any ERM system, agencies must staff the projects at appropriate levels and with the optimal mix of skill sets required for enterprise-wide deployment. How that is achieved will vary with the agency, depending upon its size, culture, interdependency of programs across multiple locations, and availability of staff.

Leadership. The success of an ERM project depends upon the involvement of a cross-section of individuals throughout the agency, including records managers, legal counsel, technologists, security officers and engineers, data (and database) administrators, management, users, and the creation of a team that is capable of executing the project plan. Equally important is leadership from within the project team and sponsorship from senior management.

Technology. ERM solutions must meet the business needs of the agency while taking into account the ability of that agency to implement and maintain the system selected. They must also be compatible with existing information systems and overall enterprise architecture.

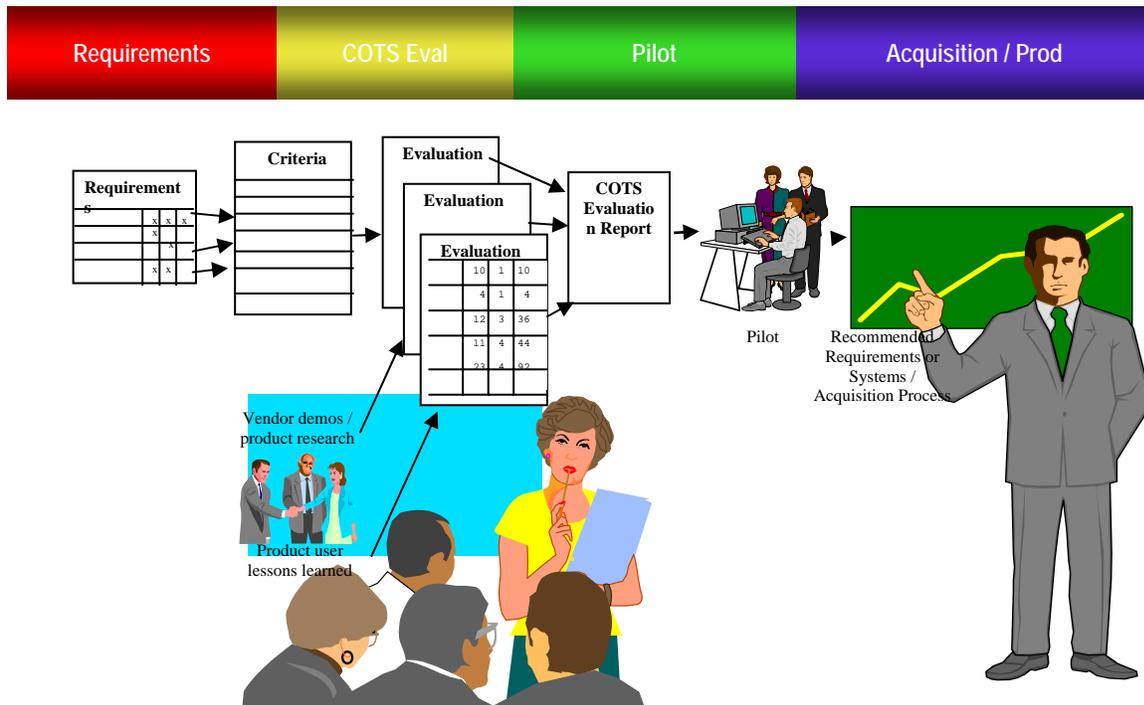
Developing a modular strategy for a total solution that meets an agency's business needs for records and document management gives a project team more flexibility in phased project development and ERM implementation. Over time, the ERM system will expand (incorporating records from legacy systems) and evolve (implementing features of the ERM solution not available at the outset).

Agencies with a larger IT staff will be able to deploy a more leading-edge solution than a smaller agency or one with many locations with few IT support staff available on-site to assist. Copying what works will save time and help you avoid the errors made by others. Look to the experiences others have had with a particular tool or process for implementing ERM in their agencies. Remember, the ERM initiative is not about "the technology," but about process improvement for the lifecycle of electronic records, from creation to disposition.

Training. Appropriate training of agency staff is an essential component of ERM project success. Acquiring an ERM solution will be of no value unless agency staff use the system to create, manage, and retrieve electronic records. Trained staff are more comfortable using systems and tend to employ them more often and more effectively than those who do not receive adequate or timely training. In addition to training on an individual system, staff will require education concerning basic records management and the unique challenges of ERM. The content and timing of training offered at each stage of ERM implementation should be appropriate to the user and agencies should employ a variety of means for reinforcing what is taught through individualized follow-up.

This section reviews the distinct lessons learned at each stage of the process characterized in the previous five guidance documents and as illustrated in **Figure 2**, Overview of the ERM Development Process.

Figure 2. Overview of the ERM Development Process



3.1 Capital Planning and Investment Control (CPIC)

Enterprise-wide ERM projects are costly undertakings, requiring a commitment of money, labor, and time. Rigorous review within the CPIC process will validate your ERM project, ensuring that it meets the needs of the agency. This process will inform those charged with:

- Developing a plan for identifying requirements for the system
- Selecting the appropriate product
- Working with the vendor to make the tool a better fit for the agency
- Testing the system prior to agency-wide deployment.

Recognizing that the goal is to implement enterprise-wide ERM systems, there may be compelling business reasons for separately funding program-specific ERM systems. Administrators evaluating a portfolio of ERM-related projects will have to:

- Determine if office-specific ERM systems should be funded and implemented independently or be integrated into the agency's enterprise-wide ERM system. . Funding restrictions, unique functional requirements, and security concerns are examples of compelling business reasons for separately funding program-specific ERM systems. Other compelling business reasons for separate funding of ERM systems, and additional general information concerning the CPIC process, can be found in *Coordinating the Evaluation of Capital Planning and Investment Control (CPIC) Proposals for ERM Applications* (<http://www.archives.gov/records-mgmt/policy/cpic-guidance.html>).

- Examine program-specific proposals to see if they overlap with the enterprise ERM goal.

The following sections describe CPIC-specific lessons learned from federal and state ERM system implementation projects. The lessons are discussed further in **Figure 3**, The Do's and Don'ts of Capital Planning and Investment Control (CPIC), below. Agencies should refer to [OMB_Circular_A-11](#) Part 7, Planning, Budgeting, Acquisition, and Management of Capital Assets and [OMB Circular A-130](#) when assessing capital planning requirements,

Strategy Lessons involve examining CPIC proposals for systems requiring ERM functionality, keeping in mind the goal of an enterprise ERM system, and the importance of comprehensive, detailed project planning before budgets are requested/authorized.

Organization. Clearly state the problems that an ERM solution will solve. For example, a problem statement such as “Business processes for managing records are too staff-dependent and it takes too long for staff to receive documents for action” would focus the search for an ERM system on one designed to automate processes with the goal of reducing the time lapse for receiving documents.

Leadership. Records officers should take the lead in evaluating an agency's CPIC proposals that contain ERM components or functionality, determining how an identified proposal supports, complements, or duplicates the agency solution.

Technology. Use the CPIC process to ensure that ERM solutions are compatible with enterprise architecture and agency's infrastructure and can be supported by technical staff plans (in-house or out-sourced capabilities). Further details concerning the Records Management (RM) Profile in the Federal Enterprise Architecture (FEA) can be found in the December 15, 2005 publication by the Architecture and Infrastructure Committee, Federal Chief Information Officers Council, *Federal Enterprise Architecture Records Management Profile*.

Training. Training is not a part of the CPIC process, but while you are reviewing and evaluating CPIC proposals with ERM requirements or functionality, you may want to provide the groundwork for what you will need to do further into the ERM development process. Assuming that basic records management training is conducted at your agency, staff training at this stage should be targeted to an agency's need for ERM and the benefits the agency, staff, and users will derive from enterprise-wide solutions. Senior management may support records management, but not fully understand the complexity of an enterprise-wide ERM solution; this is an appropriate time to begin that education process.

Figure 3. The Do's and Don'ts of Evaluating Capital Planning and Investment Control (CPIC) Proposals for ERM Projects

	Do	Don't
Strategy	<ul style="list-style-type: none"> • Develop the business case for your enterprise-wide ERM project • Examine CPIC proposals for systems requiring ERM functionality 	<ul style="list-style-type: none"> • Send mixed messages with regard to ERM. Have a consistent message concerning the importance of ERM delivered from senior management
Organization	<ul style="list-style-type: none"> • Clearly state the problems that will be solved through an ERM solution • Assess the impact of an ERM system on existing business processes and RM policies & procedures, identifying any practices that need modification 	<ul style="list-style-type: none"> • Implement ERM without first identifying a compelling business need for the system (i.e., a problem that would be solved with the introduction of such a system)
Leadership	<ul style="list-style-type: none"> • Allow qualified records officers to assume a leadership role in evaluating an agency's CPIC proposals that contain ERM components or functionality • As part of the capital planning process, perform a rigorous review of your ERM project • Ensure sufficient resources to develop/modify existing RM policies, processes, and procedures 	<ul style="list-style-type: none"> • Ignore elements of ERM within CPIC proposals • Promise too much, too soon. [Do be honest about what can be accomplished within realistic timeframes and tell management and users when milestones are likely to be missed (and why).]
Technology	<ul style="list-style-type: none"> • Consider how legacy systems should be funded (in terms of maintenance and upgrades) • Apply standards that are consistent with agency IRM strategic plan and Enterprise Architecture and will enable future migration or integration of legacy ERM systems into an enterprise-wide system 	<ul style="list-style-type: none"> • Ignore legacy systems altogether. [Do plan for eventual migration/integration of records into enterprise-wide system.] • Forget the need for back-ups of vital records to be included in the ERM system. The method you choose may require funding that should be part of the CPIC process
Training	<ul style="list-style-type: none"> • Expand existing learning opportunities that focus on RM concepts and methods by highlighting the need for ERM and the benefits of enterprise-wide solutions • Educate senior management. They may support records management, but not fully understand the complexities of an enterprise-wide ERM solution 	<ul style="list-style-type: none"> • Concentrate on specific programs or systems at this juncture

3.2 Determining Agency-unique Requirements for Enterprise-wide ERM Initiatives

Agencies differ in terms of culture, business needs, and technology infrastructure. These differences account for unique RM requirements for enterprise-wide implementation of ERM systems that are not addressed in the DOD 5015.2-STD (v.2) standard, *Design Criteria Standard for Electronic Records Management Applications* (<http://jitc.fhu.disa.mil/recmgt/index.html>) (National Archives and Records Administration, 2004). Agencies that have undertaken comprehensive requirements analyses prior to seeking an ERM solution have a clear road map for assessing the utility of COTS solutions in their agencies and judging the amount of customization that would be required before deploying the system agency-wide. The ways in which they accomplished this are discussed in the following sections and summarized in **Figure 4**, The Do's and Don'ts of Determining Agency-unique Requirements for Enterprise-wide ERM, below.

Strategy. If the goal of your ERM system is to identify and capture records within the document creation and workflow processes, you need to review existing business processes and develop a plan for improving those processes as you explore the ERM solution. Conceptualizing the full process as it exists—understanding the workflow involved in record creation, approval process, and final disposition procedures—is crucial to building a system that streamlines the process and especially important for designing the enterprise-wide search and retrieval capabilities (Electronic Records Management Guidance on Methodology for Determining Agency-unique Requirements, <http://www.archives.gov/records-mgmt/policy/requirements-guidance.html>).

Taking “a business process perspective ties discussions of records management issues to work that is critical to an organization... Not every group needs to be involved in the entire process, but each needs to participate actively at the appropriate points so that all user needs are identified and incorporated into the system design” (Kelley, Kowlowitz, Pardo, & Green, 1998, p. 9).

Develop the business case for enterprise-wide ERM by clearly defining the ERM project objectives. For example, “Deploy ERMS to more efficiently and effectively manage Agency’s records & process incoming licensing actions.” The scope of your ERM initiative should match its purpose and you should stick to that scope as the project proceeds. In terms of scope, identify the:

- Various types of agency-specific records (record formats)
- Stakeholders with differing perceived requirements
- Sensitive information to be included in the system as well as system’s authorized users and usage (e.g., password authorization to system; restricted access to classified material; respect for information covered under the Privacy Act¹; secure IT environment; who has the authority to change records or data describing records)
- Existing systems that create or store electronic records.

Organization. Organizations have records and organizationally unique Information Resources Management (IRM) policies and objectives that support paper records. Some agencies have organizationally unique Records Management (RM) policies to address a

¹ It is suggested you consult Department of Justice guidance regarding these requirements.

limited set of electronic records (e.g., e-mail). Any ERM solution should be required to support those provisions (National Archives and Records Administration, 2004).

Leadership. At this stage, begin garnering support for the ERM initiative from among all levels of agency management: direct supervisors, mid-level, and senior managers. Senior management support is particularly critical. This will give your project greater visibility and lend it credibility within the agency.

Technology. Any ERM system must fit within the existing infrastructure and the organization must incorporate ERM into the enterprise architecture. Identify unique agency infrastructure or architecture that could result in unique requirements for the ERM system. In addition to DOD 5015.2-STD (v.2), consult evolving ERM standards (National Archives and Records Administration, 2004).

Training. Use training opportunities to begin preparing the agency for change. At this stage, highlight risks of ignoring electronic records (noting applicable laws and regulations) that an effective ERM solution could remedy. In addition, you can highlight what effective ERM can do for an agency:

- Improve agency processes by making needed information readily available
- Improve office efficiency and enhance worker productivity by improving staff's ability to collaborate, building upon the work of others, and reducing duplicative efforts
- Help deliver services in a consistent, equitable, and cost-efficient manner, improving public image due to rapid, accurate, and comprehensive responses to requests for information
- Support continuity of operations in the event of a disaster
- Protect records from inappropriate and unauthorized access
- Protect the rights of the agency, its employees, and its customers.

Figure 4. The Do's and Don'ts of Determining Agency-unique Requirements for Enterprise-wide ERM

	Do	Don't
Strategy	<ul style="list-style-type: none"> • Clearly define the ERM project objectives • Keep in mind the scope of your ERM initiative. • Focus on the users' ability to access the information they need to do their jobs rather than emphasizing the ideal repository that is to be created 	<ul style="list-style-type: none"> • Sway from your project's scope as defined at this stage of the project • Expect that any one ERM COTS product will meet every requirement. Setting priorities among requirements is necessary during the evaluation process • Postpone planning for disaster recovery of vital records until ERM system is implemented
Organization	<ul style="list-style-type: none"> • Analyze and streamline business processes before seeking a technical solution • Involve as many departments, programs, locations, and functions in the process as possible. This ensures the unearthing of 	<ul style="list-style-type: none"> • Consider any ERM solution that does not support those organizationally unique provisions you uncovered during the requirements analysis • Ignore how the chosen solution

	Do	Don't
	<p>existing ERM system requirements and provides an opportunity to raise awareness concerning records management, in general, throughout the agency</p> <ul style="list-style-type: none"> • Distinguish between wants and needs 	<p>will affect workflow and established business processes</p>
Leadership	<ul style="list-style-type: none"> • Research the capabilities of today's ERM technologies • Identify key partners for your ERM project (i.e., those that rely on authentic records, have influence within the agency, and whose missions complement that of RM) • Begin to identify senior and mid-level managers as sponsors and business line champions who are likely participants for your pilot 	<ul style="list-style-type: none"> • Be insensitive to the needs of users. [Do always display a degree of flexibility as you move toward COTS evaluation.] • Over-commit. [Do be realistic about what you can and cannot deliver.]
Technology	<ul style="list-style-type: none"> • Understand the existing infrastructure and enterprise architecture in which the ERM solution must operate and take into account changes likely to occur in future • Maintain awareness of emerging practices is important in technology-facilitated projects such as RM 	<ul style="list-style-type: none"> • Ignore technology in-place. [Do recognize that your ERM system will have to work with technology (hardware and software) already in use throughout the agency and on individuals' desktops.] • Expect that one system can address all of the requirements uncovered during your analysis
Training	<ul style="list-style-type: none"> • Begin preparing the agency for change by highlighting the risks of ignoring electronic records in each training session 	<ul style="list-style-type: none"> • Assume that staff understands the basics of records management and their importance to the agency

3.3 COTS Evaluation

Identifying COTS software that meets an organization's enterprise-wide ERM needs can be a daunting task. In approaching this challenge, it can help to understand how other organizations have tackled this effort, the obstacles they have faced, and the innovative solutions they have devised.² The Information Technology Resources Board (ITRB)³ can provide valuable feedback to agencies planning an enterprise-wide ERM project. The following sections describe how project managers have addressed specific challenges in

² An integrated baseline review of the enterprise's technology may also assist in COTS selection.

³ The Information Technology Review Board (ITRB) is a group of senior IT, acquisition, and program managers with significant experience developing, acquiring, and managing information systems in the Federal Government. Members are drawn from a cross section of agencies and are selected for their specific skills and knowledge. The ITRB provides, at no cost to agencies, peer reviews of major Federal IT systems. Additional information concerning the Information Technology Review Board can be found on the Board's website (<http://itrb.gov/>).

selecting COTS software for their ERM initiatives. The Do's and Don'ts of COTS Evaluation for ERM are summarized in **Figure 5**, below.

Strategy. Performance measures should be developed for the ERM solution, recognizing that they will probably need revision as the project progresses. Aligning ERM performance outcomes with your agency's mission, goals, and business strategies—and quantifying benefits derived from ERM—provide benchmarks on which to base management decisions and measure success.

Organization. Agencies that view their ERM as a partnership—with sponsors, senior management, target user groups/stakeholders, information technology departments, legal counsel, records managers, and vendors—are likely to have a smoother course from initiation through implementation. Involving people—keeping them informed about the progress being made and training them to be good records managers—encourages them to use the new ERM system.

Leadership. All teams require leadership, sponsorship, and management to succeed. An enterprise-wide solution has a better chance for success if there is an executive-level business line championing the project. Motivators are needed, particularly from the ranks of senior management; coaches on the project team help colleagues and stakeholders learn how to use ERM systems to their advantage.

Technology. The overall business need, rather than the technological features of a COTS product, should drive the selection of a vendor partnership. Choose the solution that best meets your agency's business needs and will work best in its environment. This may not be the system with the most “bells and whistles.” No single vendor solution will be able to meet all needs discovered during the ERM requirements gathering stage. Waiting until that is the case (or customizing a COTS product to address each need expressed during the requirements analysis) is a costly and futile approach. Agencies are advised to integrate the best functional components for priority needs as opposed to seeking a “total solution” for ERM projects. If the software cannot support stakeholder requirements, the COTS product will require substantial customization, leading to delays in implementation and costs that exceed original projections.

Training. Begin to introduce the mechanics of ERM into records management training at this stage. Those involved in the requirements analysis and COTS evaluation will now be ready to receive information about how ERM will change the way they do their work.

Figure 5. The Do's and Don'ts of COTS Evaluation for ERM

	Do	Don't
Strategy	<ul style="list-style-type: none"> Evaluate the spectrum of options and present a detailed analysis of the most cost-effective and risk averse solution Focus first on business needs and records that support them, then on technology (Kelley, Kowlowitz, Pardo, & Green, 1998, p. 10) Focus Return-on-Investment (ROI) on tangibles, such as steps 	<ul style="list-style-type: none"> Make the development process overly complicated. [Do take a phased approach to deployment; this will limit the number and magnitude of errors.]

	Do	Don't
	<p>removed from a process or minutes saved retrieving a document</p> <ul style="list-style-type: none"> Recognize and communicate that, at the start of implementation, ERM may slow processes until users master the new business procedures and the ERM system itself 	
Organization	<ul style="list-style-type: none"> Simplify file plans, as appropriate, prior to pilot implementation. Adopt standardized file plans and naming conventions Develop and implement a communications and marketing plan for ERM that addresses how ERM supports and facilitates your agency's mission and its business objectives, providing a clear understanding of the scope of the project and its desired outcomes 	<ul style="list-style-type: none"> Wait until implementation to involve the potential users of the system
Leadership	<ul style="list-style-type: none"> Inspire users with the opportunities ERM solutions present 	
Technology	<ul style="list-style-type: none"> Select an ERM solution that is easy to use, that can be installed with a minimal amount of customization or changes to existing infrastructure, and is easy to deploy (particularly if offices lack sufficient IT support) Focus on system functionality before choosing specific technologies (Kelley, Kowlowitz, Pardo, & Green, 1998, p. 10) Establish that ERM solution will work within Agency's technical environment (Enterprise Architecture) and be compatible with anticipated changes in technology Ensure that any ERM solution being considered has a many layered and flexible scheme for restricting access (e.g., rights to view, check out and file records at the document or folder level; ability to know that a folder exists 	<ul style="list-style-type: none"> Seek a "total solution" or select a system based on its features rather than as a solution for the business needs of your agency staff Ignore standards Ignore realities of technical support, particularly in non-headquarters locations. [Do develop plans to compensate for areas where little technical support is available.] Ask a vendor if their product is capable of performing a particular task. [Do ask the vendor to demonstrate exactly how the product performs the task, analyzing the demonstration from the perspective of the typical user] Expect promises of product improvement by the vendor to be delivered on-time Ignore hidden costs for items not

	Do	Don't
	<p>and/or view records within the folder; documents/file folders assigned security codes to prevent unauthorized access) and can meet agency security requirements and minimum set of controls to be included in Federal automated information security programs, per FISMA and OMB Circular A-130, Appendix III (http://www.whitehouse.gov/omb/circulars/a130/a130appendix_iii.html)</p> <ul style="list-style-type: none"> • Take into account the need for assuring authenticity and integrity of electronic records, including version control and signatures • Consider the ability of the ERM solution to interface with hard copy RM systems used by Agency • Establish performance standards, incorporating them into specifications (Nevada State Library and Archives, 2000) • Prepare specifications that will require vendors to continue to support and maintain their products (Nevada State Library and Archives, 2000) • Ensure that data taxonomy, metadata standards, and a partition of content in relevant collections are developed and implemented, when necessary • Obtain commitments from vendor to remain involved through agency-wide deployment • Be realistic about costs and savings 	<p>specified as included in vendor agreements</p>
Training	<ul style="list-style-type: none"> • Introduce the mechanics of ERM into records management training, highlighting some of the features present in all systems 	<ul style="list-style-type: none"> • Train on a specific system until one has been approved and tested

3.4 Governance Structure

By using appropriate governance structures, project managers increase the likelihood that their ERM system will operate efficiently and be fully integrated with agency architecture and infrastructure. The establishment of cross-functional teams from all critical business functions, in addition to records managers and IT personnel, characterizes all successful governance structures. These groups must adopt an enterprise view in order to operate and this extends to the ERM application.

Certain factors are associated with successful IT governance and this, in turn, results in successful enterprise-wide IT projects such as ERM. These factors include:

- Having executive leaders who are champions of IT and who emphasize its value in achieving the agency's mission
- Using a participative management style that emphasizes collaboration and communication
- Establishing incentives rather than mandating cross-agency collaboration, recognizing departments for working together to build an ERM solution that may not meet the needs of all groups involved, but is the best choice for the agency; rewarding those departments/office locations that volunteer to pilot the system. (For example, lightening the workload during the pilot testing, extending deadlines on other assignments.)
- Displaying a commitment to staff during periods of change. Retraining and redeploying personnel—giving them opportunities to learn new skills and assume new roles—allays fears and engenders support for new initiatives
- Employing a modular approach when developing and implementing IT initiatives, so that the successes of one installation can be replicated as new features are offered to users, and failures in implementation (e.g., processes) can be rectified before other types of records or office locations are incorporated into the system.

Federal agencies that have established a governance structure for their ERM projects have identified several key elements that must be present for the structure to provide its intended outcome. These include a strong project management officer (PMO), a multi-tiered governance structure, optimal composition of the committees, and the use of small workgroups. These elements are discussed in the following sections and summarized in **Figure 6**, The Do's and Don'ts of Governance Structure for ERM Projects.

Strategy. Technology projects require detailed planning for the structure of the project, scheduling, budgets, implementation, project controls, and a determination of forces that might hinder the project, whether internal to the project/agency or external to it. A strong governance structure provides a framework for excellence, focusing on quality and the ability to sustain excellence through the lifecycle of the project, from initial discussions through implementation enterprise-wide.

Organization. The nature of the governance structure, with individuals from many departments and locations, encourages collaboration that extends beyond the ERM project itself. Collaborative efforts will help project managers (and others responsible for ERM) gain the trust and cooperation of staff who are being asked to adopt new procedures for dealing with records they create.

Leadership. ERM projects are more easily completed if there are champions among the management who relate the value of ERM to achieving the agency’s mission.

Technology. Records management skills and IT skills (including data administration, database administration, and security) are as important to the success of ERM projects as is an understanding of the business need driving the initiative and the business processes affected by the ERM installation.

Training for the new ERM tool is an opportunity to refresh staff’s understanding of the importance of records management to the agency. A well-trained staff is more apt to follow procedures as a matter of course. Individuals who are unsure of how to use the system (and why) are less likely to employ the system correctly.

Figure 6. The Do’s and Don’ts of Governance Structure for ERM Projects

	Do	Don’t
Strategy	<ul style="list-style-type: none"> • Use the governance structures already in place at your agency for ERM projects before establishing any new committees • Ensure that senior-level management is aware of and involved in addressing change management issues (U.S. Nuclear Regulatory Commission, 2001) • Modify performance plans and goals to stress elements that appear they will promote participation in and enthusiasm about the project 	<ul style="list-style-type: none"> • Forget to modify records policies and management practices changed to accommodate introduction of ERM • Fail to continually reassess progress and resource needs • Fail to consider the costs associated with running parallel processes, particularly during the pilot phase
Organization	<ul style="list-style-type: none"> • Assign a qualified project manager to the project. • Use governance mechanisms to address tensions between central (headquarters) and local control of ERM • Establish an executive steering group made up of major stakeholders who have the power to fund the project. Involve legal counsel on records technology projects • Involve key functional, technical, and contract personnel in the various committees established to govern your ERM project • Hold regularly scheduled meetings, particularly during the pilot phase • Convene smaller, ad hoc work groups with individuals possessing appropriate skills to address specific issues that arise • Formalize governance structures for ongoing collaboration and decision- 	<ul style="list-style-type: none"> • Underestimate the need for qualified staffing of the project or the time/resource commitment required for successful implementation of ERM

Do	Don't
<p>making</p> <ul style="list-style-type: none"> • Employ collaborative tools and techniques among the members of the various teams and groups established to implement ERM • Communicate information concerning the project to the entire agency. This will serve to manage users' expectations • Assign an individual who has the skills and can dedicate the appropriate amount of time to project communication (U.S. Nuclear Regulatory Commission, 2001) 	
<p>Leadership</p> <ul style="list-style-type: none"> • Involve key stakeholders from programs, headquarters, and other offices • Establish a Program Management Office (PMO) responsible for the introduction of the agency-wide ERM project and associated business process change • Determine resource requirements for an ERM pilot and full-scale deployment. Revise estimates for agency-wide deployment costs as the pilot progresses 	<ul style="list-style-type: none"> • Ignore the concerns of individuals located a distance from headquarters
<p>Technology</p> <ul style="list-style-type: none"> • Consider ERM solutions with respect to enterprise architecture, existing information technology infrastructure, and anticipated advances in technology. • Develop a plan for ERM system maintenance and enhancements, including associated funding • Ensure that the pilot can scale up, both in the number of users in the organization and in the number of records stored. With the ease of 'click-and-drag' storage, the volume of managed records may increase 	<ul style="list-style-type: none"> • Ignore how the ERM project fits into the range of IT projects planned or underway at your agency • Discount the effect of rapid technological obsolescence of hardware and software on your ERM project
<p>Training</p> <ul style="list-style-type: none"> • Educate senior management as to the need to commit to change, adjust priorities, and actively participate in agency's ERM initiative • Train project team on their roles and responsibilities 	<ul style="list-style-type: none"> • Assume that team members possess project management skills. [Do] provide PM training, as appropriate, including an emphasis on collaborative work group skills

3.5 Developing and Implementing an ERM Proof of Concept Pilot

A pilot project provides agency staff with experience using an ERM system and, barring a poor evaluation, results in approval to go ahead with full implementation. Pilots provide insight to enterprise-wide challenges and the opportunities to improve business processes. Agencies conducting ERM pilots reduce their investment risk. The following sections provide the strategies employed by project managers in executing successful ERM pilot projects. Their knowledge is summarized in **Figure 7**, The Do's and Don'ts of ERM Pilot Projects, below.

Strategy. Select pilot participants from among groups (departments or programs) that have a genuine stake in the success of the project. Individuals on your team should be open to the changes in store for themselves and the agency. Their focus should be on the product and the project, with other work coming secondary.

Incremental rollout of a pilot allows project teams to manage the process effectively. That way, your project team can take what it learns from one phase and apply it to the next, avoiding unnecessary delays and costs. A phased approach also helps with evaluation measures, limiting the number of metrics to be gathered at any one time.

Develop a series of calendar-defined work steps; at each stage, deliver the best that can be done in the allotted time. Do not allow the pilot project to drag on too long. A simple pilot project that can be implemented without major difficulties requires at least six months to conduct, excluding pre-planning activities (including any training conducted during that planning stage) and post-pilot evaluation.

Organization. Keep ERM pilot projects simple. Don't try to test more variables than a pilot project can handle well. Slowly increase the number of departments or programs involved in the pilot, as well as the number and formats of records, thoroughly testing the functionality of the ERM system.

ERM project managers recommend designating a Point of Contact (POC) or SuperUser within each group selected to participate in the pilot. The POC can keep the pilot project team aware of what is going on with the users (and apprise users of decisions made by the pilot project team).

People react differently to change. While users want to be involved in policy decisions, they do not want to have to constantly think about ERM. Limit the number of decisions users need to make when creating and declaring a record. Simplify file plans, simplify and automate organizational forms, use templates, and consider rule-based auto-categorization to minimize daily decision-making, recognizing that no single auto categorization tool currently available will address every requirement.

Individuals need to see the difference that ERM makes in their daily routine tasks, but this takes time. Usage of the software grows through the peer pressure associated with business process improvements. Individuals must see advantages in their own work if the implementation effort is to succeed (Bikson & Eveland, n.d.).

Leadership. Management support for the project influences the degree to which staff will utilize the system: While there may be strong support from senior management for ERM, there must be specific "continuing and visible support from the top for this particular pilot project during the trial period" (Bikson & Eveland, n.d., p. 14). In addition, support from mid-level managers and direct supervisors are critical to motivate users.

Technology. Lessons learned with regard to technology are primarily based on the State of Michigan Department of History, Arts and Libraries *Records management*

application pilot project: Final report for National Historical Publications and Records Commission grant #2000-059 (2002, pp. 17-18).

1. Use thin client architecture. This allows IT staff to deploy the software quickly and easily, with no need to customize the desktop.
2. Avoid macros and integrations with software that requires extensive modification of individual desktops. The macros are unreliable and, in addition to changing frequently, software on the desktop varies with the department and location. Each new version will threaten the connectivity of the macro or integration.
3. Integrate the product at the operating system level. Operating systems upgrade to new versions slower than desktop applications, and there are fewer to integrate.
4. Client-server architecture is difficult to deploy. Develop a robust Web-based product that works the same way a client server version of the product would work.
5. Make the ERM software appear invisible to the user. Allow the ERM server and file plan to look like another local drive and directory that the user accesses when saving and opening documents. Let the user perform the “save as” or “open” function, see the ERM drive, and navigate through their file plan to the desired file. This will boost user acceptance and reduce the amount of training required.
6. When selecting new ERM software, be diligent in researching the viability of ERM products. The corporate acquisition process can cause high volatility in the vendor market, with some products losing support for continued innovation post-acquisition.

Training. ERM software requires technical training that needs to be reinforced throughout the pilot and beyond. This makes training a substantial cost item. Use POCs to provide program, department, or location-specific training to users, reinforcing the general training provided for the ERM project. Performance measure reports will help project teams determine elements of training that need to be highlighted/reinforced.

Figure 7. The Do’s and Don’ts of ERM Pilot Projects

	Do	Don’t
Strategy	<ul style="list-style-type: none"> • Adopt a phased approach of useful segments to the entire project, including the pilot • Determine the information that is important to capture during your pilot and automate as much of the process for documenting this at the outset • Have a skeleton policy on system use in place before the pilot begins • Be willing to restructure the pilot if the situation warrants so that you can assess how the full-scale implementation will proceed, • Adjust schedules as needed to ensure the quality and acceptance of work products • Conceptualize the full process while you conduct a limited 	<ul style="list-style-type: none"> • Allow the pilot project to go on too long. [Do] adhere to your pilot schedule • Ignore feedback from the pilot. [Do] use it to refine new processes before large-scale deployment • Think that the project ends (your job is done) upon deployment of the system. Modifications and upgrades of software will be required as new features are activated and additional groups/types of records are brought into the enterprise-wide ERM system

	Do	Don't
	<p>implementation to test business outcomes and quantify benefits</p> <ul style="list-style-type: none"> • Allow users to configure the software and shape associated procedures to the business processes and accommodate user-generated innovations into the system 	
Organization	<ul style="list-style-type: none"> • Prepare staff for on-going refinement of the system • Pre-sell the system by relating benefits to everyday tasks/routine work of staff. Find incentives for use and disincentives for avoidance • Document the decisions made during the pilot and use this information to shape full-scale implementation • Develop a mechanism to handle issues as they arise during the pilot phase • Create multiple methods for supporting participants in the pilot project (e.g., one-on-one training; help desk) • Clearly define responsibilities of pilot project team members • Understand that things do not always work right the first time • Know that it will take time for staff to adjust to using a search engine as a retrieval tool instead of navigating file plans 	<ul style="list-style-type: none"> • Ignore the importance of communication. [Do use the pilot to test a variety of communication techniques (tools and message content) to “market” ERM. Whenever and wherever possible, communicate the benefits of ERM applications, as well as end users’ roles and responsibilities. Continuous communication about the project (within the pilot team, to members of the governance structure established for the project/agency, and staff-at-large) will minimize any need for “damage control” when things do not proceed as expected]
Leadership	<ul style="list-style-type: none"> • Team leaders should have participated in successful pilot projects in the past • Pay attention to small problems; otherwise, they may grow into big ones 	<ul style="list-style-type: none"> • Ignore the results of your pilot’s risk-benefit analysis in recommending agency-wide deployment • Overlook potential problems simply to keep the pilot on schedule
Technology	<ul style="list-style-type: none"> • Thoroughly test all systems prior to deployment. Sequential piloting of ERM—slowly adding programs or departments to the pilot—will allow teams to tweak the system before testing additional modules or functions • Establish a set time for regular 	<ul style="list-style-type: none"> • Forget to back up record series involved in the pilot

	Do	Don't
	<p>communication with the vendor to ensure issues are addressed in a timely fashion</p> <ul style="list-style-type: none"> • Ensure that your pilot solution can scale up to handle agency-wide ERM needs • Provide both “pull” and “push” options for support to pilot project participants. Examples of “pull” items include loading user manuals and maintaining FAQs on an Intranet or Web site. An example of a “push” option would be calls initiated by the pilot project team to see if participants need further assistance. • Make sure that pilot project teams have a solid understanding about what the software can deliver and how it works. Make certain that it functions properly during pre-pilot testing before involving users • Test usability of system interface 	
Training	<ul style="list-style-type: none"> • Follow-up introductory training sessions by individualized coaching at participant workstations • Develop your POCs or Super Users by including them in training and testing of the system before the formal pilot launch 	<ul style="list-style-type: none"> • Ignore differences in training preferences among staff. [Do employ multiple avenues to learning and provide assistance to pilot project participants]

4. Critical Components and Success Factors for ERM Implementation

Project managers of ERM initiatives point to specific elements that contribute to successful implementation. Above all else, the decision to implement ERM must be driven by the business needs of the agency and not viewed by management or staff as a separate activity. ERM projects will have an easier time meeting the goals of managing the lifecycle of electronic records, from creation through ultimate disposition, and agency-wide deployment of an ERM solution if they:

- Adhere to A-11 and A-130 policy and requirements
- Are realistic about the resources that the project will require (manpower and budget)
- Allot adequate time for thorough research, cultivation of stakeholder involvement, pilot testing, and change management
- Present a formal, detailed business case for the ERM project that provides the strategic rationale for the project; the risk/benefit and cost/benefit analyses necessary to make a strong economic case for proceeding; and the beginnings of a management plan for the project that:

- Identifies critical success factors
- Develops a strategy for managing identified risks
- Deals not only with the implementation phase, but ongoing maintenance and development of the system in future (National Archives (UK), 2001)
- Know your stakeholders; understand and confirm their expectations. Learn (and then address) their concerns. For example, including record ownership/control issues can be addressed through password authorization to the system, restricted access to classified material, respect for information covered under the Privacy Act, and other features of a secure IT environment
- Appoint sufficient numbers of trained staff to the project team who possess a combination of technical (records and IT) and project management (PM) skills to ensure successful implementation and expected return on investment
- Review existing agency records policies and procedures, giving adequate attention to simplifying file plan/filing structure
- Compile information concerning the existing environment, creating the baseline against which post-ERM improvements will be measured
- Use a variety of approaches for the ERM implementation, including:
 - Pilot systems for early learning and avoidance of pitfalls
 - Enterprise-wide but phased rollout
 - Modular rollout (one business process at a time)
 - Incremental rollout (levels of functionality implemented in stages) (National Archives (UK), 2001, p. 8).
- Create a detailed integration and/or migration strategy for legacy systems
- Assure that an adequate system exists to back up vital agency records
- Develop a clear plan for continuous improvement of both the system and processes related to ERM (i.e., routine maintenance, software upgrades, introduction of new features, expansion of system to new types of records/programs).

5. Strategies for Minimizing Barriers to Agency-wide Implementation of ERM

ERM projects can encounter significant barriers preventing smooth implementation, organization-wide. The following factors were cited most often as having slowed or stalled ERM projects at federal and state agencies:

- Absence of necessary change management and business process improvement efforts before implementing enterprise-wide ERM solutions
- Lack of agency processes supporting distributed records and information management. In particular, the move from centrally-managed records and information to a decentralized environment makes everyone a records manager without necessarily understanding the importance of the responsibility, the processes employed at the agency, or the tools to manage records and information effectively (Electronic Records Policy Working Group, 2004, p. 7)

- Lack of consistency within an agency as to how records are identified and maintained, indicating a need for education of staff as to the importance of RM to the agency and the need for a uniform approach in this age of information and knowledge work
- Incomplete articulation of business requirements related to the full scope of the records lifecycle (production, collection, use, management, maintenance, preservation, and disposal or permanent retention)
- Incomplete baseline, performance measures, and anticipated outcome statements for each module and project phase so that reasons for project success/failure could not be communicated clearly
- Limited consensus among stakeholders about unifying and improving workflow and processes prior to implementing ERM
- Lack of leadership and appropriate commitment from management in support of the ERM project
- Lack of consistency in staffing the project team, with members frequently reassigned to other projects/duties. Agencies can remedy this situation by making participation in pilot projects a priority and limiting the movement of staff while involved on project teams
- Reorganization of agencies affecting the programs and departments involved in the ERM project can stall momentum at any stage; changes in agency leadership can delay decision-making with regard to funding and implementing ERM projects.

Figure 8 summarizes some of the more significant barriers and suggested means for resolving these difficulties.

Figure 8. Barriers to Agency-wide Implementation of ERM and Potential Solutions

Barriers to Agency-wide Implementation of ERM	Potential Solutions
Records management processes and procedures are not integrated into agency business processes	Build records and information management responsibilities and standards into work processes by reinforcing the importance of RM as critical to agency mission during all training opportunities and in all written policies. "By concentrating on information management as part of coordinated records, information, and knowledge management strategies, agencies will be able to adapt to the demands of an evolving business environment." (Electronic Records Policy Working Group, 2004, p. 9)
If systems have not been inventoried and processes remain undocumented in the agency's Enterprise Architecture	Inventory systems in place and document processes to create a baseline against which change can be measured once the ERM system is operational
Relatively high cost of enterprise-wide systems—not only for the system, but time to implement, maintain, and upgrade—make it easy for	Emphasize the need for enterprise-wide management of knowledge (i.e., documents and records; data and information) and the difficulties

Barriers to Agency-wide Implementation of ERM	Potential Solutions
agencies to deploy resources elsewhere	encountered (and high costs involved) when multiple repositories exist within an agency
Quest for a single, perfect COTS product that meets all requirements means that the agency will never get beyond the evaluation stage	Seek the best solution for the business needs of your agency. Develop a modular strategy, integrating the best functional components today and remain flexible for modifications and future technology innovations
Inadequate staffing, in terms of total numbers of individuals involved, time they have available to devote to the project, and skill sets they possess (records management, technical, and project management)	Consider employing contract workers for specific tasks, employing appropriate oversight to accomplish the project
Resistance to change and reluctance to use full-features of software. Users are frustrated when systems are too complex	<p>Employ easy-to-use systems and thoroughly test interface</p> <p>Educate staff regarding the need to change; they must dispense with the notion that RM is a clerical function and not their responsibility</p> <p>Provide training and support that is customized for the way staff learns</p>
Users are afraid of losing control (e.g., the ability to add/remove files from the file plan; restrict access to documents/records/information)	<p>Acceptance can be improved by being responsive to requests for modification of the technology or process</p> <p>Implement appropriate levels of security to control access to records (e.g., password authorization); develop a method for handling exceptions that is easily understood by staff</p>
Users won't use the system until they see benefit; won't see benefit until they use the system	<p>As time progresses and team-based work groups become more prevalent, reluctant staff will have to use ERM to retrieve records generated by others and pertinent to their work</p> <p>Emphasize the importance of records management with new hires at your agency so they begin work on the right footing (44 U.S.C. 3102)</p>

6. Summary

Deploying an enterprise-wide ERM system poses many challenges. Several agencies have employed effective means to overcome the obstacles they faced in launching their ERM initiatives. Project managers recommend that agencies:

- Thoroughly plan ERM projects, from the construct of the initial problem statement that led to the decision to purchase ERM software through agency-wide deployment of the ERM solution
- Focus not only on securing the commitment of senior leaders, but also concentrate on obtaining stakeholder buy-in, zeroing-in on records-intensive processes of key departments/programs that are essential in supporting your agency's mission
- Assign talented and competent staff to the project team who possess technical (IT skills (e.g., security engineers, data administrators, database administrators, network managers) and information management (document and records managers) skills, as well as project management experience. For those who are new to project management, provide adequate training using the [IT Project Manager \(PM\) Guidance Matrix](http://cio.gov/documents/Federal%20IT%20PM%20Guidance%20Matrix.ppt) (<http://cio.gov/documents/Federal%20IT%20PM%20Guidance%20Matrix.ppt>) and other documents on the CIO Council web site for guidance. At least one member of the team should have communications skills to assist with the development and execution of a marketing and communication plan for your ERM project
- Clarify timelines in advance, and be honest when milestones are likely to be missed, explaining to management and users the reason for the delay
- Ensure that your agency's infrastructure leads the application, and not the other way around. Even if it meets all of your agency's ERM requirements, do not acquire an ERM system unless it can work within your enterprise architecture and is consistent with agency strategic IT plan
- Purchase COTS products. Custom design is time-consuming and costly. Select a solution that is easy to acquire, configure, deploy, and use
- Find ways to minimize the burden on the system user (e.g., by employing templates and rule-based auto-categorization)
- Integrate ERM with other IT systems; make ERM appear as just another application on the desktop, with prompting to 'Make A Record' if necessary
- Ensure pilot success before deploying the system agency-wide.

This guidance document reflects the combined knowledge acquired by project managers who have participated in various capacities in ERM projects. The approach you choose (for identifying enterprise-wide projects through the CPIC process, assessing system requirements, determining the most appropriate COTS product to acquire, thoroughly testing system functionality in a pilot, and managing the entire process within a formal governance structure) should seek to enhance users' everyday business use as well as satisfy agency records retention responsibilities.

Appendix: Resources for Creating an ERM Lessons Learned Knowledge Center

- Architecture and Infrastructure Committee, Federal Chief Information Officers Council and National Archives and Records Administration. (2005, December 15). *Federal enterprise architecture records management profile, version 1.0*. Retrieved February 15, 2006, from <http://www.archives.gov/records-mgmt/pdf/rm-profile.pdf>
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