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1. Executive Introduction

An enterprise resource planning (ERP) implementation and its associated business process changes transform the critical elements of an enterprise. Prior to ERP systems, an enterprise’s legacy systems were typically organized around functions or departments (e.g., sales, purchasing, inventory and finance), not around the business processes (e.g., Purchase-to-pay, Order-to-cash). Functions evolved independently of other functions. ERP systems, on the other hand, have a business process focus. Their relational database tables are designed around a complete set of core functions rather than disparate modules that merely pass transaction data from one module to another. Traditional paper-based audit trails can be lost as the internal control structure is transformed to support ERP-enabled business processes. Controls shift from detective to preventive, and traditional matching reconciliation controls are automated in the ERP software. Consequently, it makes enormous business sense to ensure that adequate controls are properly integrated into the reengineered ERP-enabled processes.

Senior management support of the project is crucial. This decision is certainly one of the most important decisions that executives can make. The business case for an ERP system needs to be carried through implementation—guided by detailed work plans, milestones and benefit scoreboards. Business process owners who will ensure effective communication of the dependencies of processes need to be established. Configurable options need to be thoroughly explained to users and documented in the business requirements, design or blueprint documentation. Changes in the system of business controls need to be considered early in the implementation process and included in the design to minimize the cost of retrofitting controls at a later time. System performance must be tested to ensure that the application and related infrastructure can handle the typical transaction loads processed by the enterprise. Business continuity management plans need to be revised, taking into consideration the ERP system as a single point of failure. An online, real-time system also needs an online, real-time business environment to effectively monitor and deal with exceptions. The IT infrastructure requires the same planning as the business processes. Data conversion is an area of key importance for an enterprise and its auditors.

Audit can contribute to an ERP implementation in a number of ways. Audit can become involved from the earliest stage of the project, assisting the project team with the designing and building of the controls. A preimplementation review of controls design can point out issues to be resolved before the system is operational. A postimplementation review focuses on the implementation of controls. The most complex role involves the performance of a quality assurance audit. This requires audit participation throughout the project, focuses on the overall quality of the business process reengineering program and considers specific deliverables at each project milestone. Involvement throughout ERP implementation allows audit to contribute to the establishment of the most effective control environment possible; however, an independent party may then be needed to perform a postimplementation review.
The implementation of an ERP system can introduce new risk and alter an enterprise’s risk profile. Risk and control assessment requires a framework covering the areas of business process controls, application security, program interface and conversion controls, technology infrastructures, and project management. When control issues are identified, the auditor should attempt to uncover and report to management the causes of the problem and his/her recommendations. In this respect, the COBIT framework can help meet the multiple needs of management by bridging the gaps between business risk, control needs and technical issues. It provides good practices across a domain and process framework and presents activities in a manageable and logical structure. COBIT’s good practices provide a measure to judge against when things do go wrong and can assist in identifying problem causes.

The first-year audit of enterprises that have implemented ERP systems needs to be carefully scoped because there is often a combination of centralized accounting controls and decentralized operational controls. A detailed knowledge of ERP systems is necessary to effectively understand security and control issues over application areas, and the technical environment and automated diagnostic tools are required for application security and data integrity assurance.

In the e-enabled ERP environment, control solutions for risk associated with e-business must be developed. The traditional control framework must be extended to include identity management, content quality, privacy, collaborative commerce and integrity.

Between the covers of this book, readers will find all the details needed to confidently plan and execute a detailed review of risk and controls in a PeopleSoft environment.

This book is one in a series of technical and risk management reference guides dealing with security, audit and control features of ERP systems. This series of guides is intended to be considered collectively. Consequently, common business processes and the related risk and control features are not covered in each and every guide. This guide covers the Human Resources (HR) and Payroll components of PeopleSoft 9.1.

ISACA’s *IT Audit and Assurance Standards, Guidelines and Tools and Techniques* offers additional guidance to IS auditors. Guideline G21, Enterprise Resource Planning (ERP) Systems Review, is particularly relevant.

**What Has Changed With the Third Edition**

A lot has changed in terms of new product features, new releases and various regulatory compliance requirements for enterprises since the second edition of this guide published in 2006. This third edition aims to ensure that the audit programs, risk and controls are

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1 ISACA, COBIT 5, USA, 2012, [www.isaca.org/cobit](http://www.isaca.org/cobit)
1. Executive Introduction


This guide also updates the audit plans to incorporate COBIT 5. In addition, chapter 12, New Directions for PeopleSoft and ERP Audit, discusses the changing compliance landscape, tools to assist with compliance and Oracle Fusion, and the pathway for PeopleSoft installations.

How the Book Is Organized

Introduction to ERP Systems
The evolution of ERP software is described from its early beginnings in material requirements planning packages centered on manufacturing to the present-day systems that provide enterprisewide, integrated solutions and extensions to suppliers and customers beyond traditional organizational boundaries. The benefits and characteristics of ERP systems are also discussed.

Introduction to PeopleSoft Applications
The PeopleSoft organization and the innovation surrounding the development of the PeopleSoft ERP application system are introduced. Major PeopleSoft modules, products and functionality are overviewed, and guidance on navigating PeopleSoft is provided. The manner in which an ERP implementation and its associated business process changes transform critical elements of the business, including the control environment, is outlined.

Strategic Risk Management in an ERP Environment
Strategic-level business risk (e.g., business process, application and technical infrastructure security, data conversion, program interface, and project management risk) and key management controls for ERP implementations are outlined, leading to a discussion of the importance of establishing an integrity framework for ERP environments. The impacts on audit following the implementation of an ERP system are also described. The purpose of this chapter is to help enterprises minimize the risk of not obtaining the significant benefits that can flow from a well-executed ERP implementation.

ERP Audit Approach
Audit impacts arising from the implementation of ERP are detailed, and frameworks and methodologies for auditing and testing in a PeopleSoft environment are provided. These include a recommended PeopleSoft audit framework, guidance on adopting a risk-based audit approach to ERP systems, an overview of the PeopleSoft authorization concept, how to test PeopleSoft security, configurable controls, and segregation of duties/excessive access. The need to identify the causes of issues arising from audit or control testing and a technique to assist in identifying the cause of issues with using the COBIT framework are also described.
Auditing PeopleSoft
The relationship between PeopleSoft and the major business cycles operating within enterprises is explained. The core business cycles, i.e., HR and Payroll, for a manufacturing enterprise and their integration are overviewed. For each of these business cycles, the functionality of the PeopleSoft business process and its subprocesses is described from a controls perspective. Specific risk is identified, potential automated controls are outlined, and sample testing techniques are suggested. Techniques for testing user access to business cycle functions and segregation of duties are also described.

New Directions for PeopleSoft Audit
The guide concludes by looking at the various stages through which ERP audit has progressed and looks ahead at two major new directions that are emerging for ERP audit—continuous assurance techniques (e.g., application security assurance and data assurance) and extension of the traditional ERP control framework in response to the growing e-enabled ERP environment. The available tools for continuous assurance in a PeopleSoft application’s environment are overviewed, and a sample control framework for the e-ERP environment is provided. The changing compliance landscape and PeopleSoft applications’ solutions are profiled from a controls perspective. Finally, a discussion on Oracle’s Project Fusion and the implications for PeopleSoft installations are presented.

A well-executed ERP implementation can provide significant benefits to the enterprise. Senior management support and audit involvement in the project can help ensure full benefit realization of an ERP system.

Who Should Read This Book
This publication has been written with the business manager in mind. IT and audit and assurance professionals will also find it highly informative and helpful. Other audiences include security and risk management professionals. Parts of the publication are written for those looking to learn more about how PeopleSoft applications work, as well as the strategic and risk management issues. However, for the most part, the book assumes that the reader has a fundamental working knowledge of PeopleSoft.

What Makes This Book Different
Although there are many books that have been written on PeopleSoft, they are more narrowly focused on the implementation, business aspects or how one of the PeopleSoft modules actually works. This publication is unique in that it deals with aspects of risk management, audit, security and control over PeopleSoft. These are important aspects that have not been dealt with previously in a comprehensive manner in one publication. The book is also unique in that it contains audit/assurance programs, audit suggestions and internal control questionnaires (ICQs) for the business cycles addressed within the publication.
Prior to ERP systems, an enterprise’s systems were typically set up around functions or departments (e.g., sales, purchasing, inventory and finance), as depicted in figure 2.1, not the business processes (e.g., purchase to pay, order to cash). Functions evolved independently of other functions. Each function may have had an individual application system or a number of disparate systems to support it, with or without interfaces between the systems. This resulted in the maintenance of a series of disparate and decentralized systems, with duplication of data and inconsistent implementation of security and controls across an enterprise. Frequently, business controls had a high manual component.

Prior to the widespread use of ERP systems, it was common that:
1. Purchase orders (POs) were approved when generated.
2. When the invoice arrived, the PO was either printed out again or retrieved from filing and stapled to the invoice.
3. The invoice was approved for payment.
4. Once again, the documents may have been scrutinized and approved during the check payment process.

Non-ERP systems also suffer from a design problem in that they are typically designed around disparate and independent modules that transmit transaction data among themselves by means of “interfaces,” where the information is normally summarized (e.g., totals or balances only) in nature. In cases like these, further details of such transactions are often difficult to ascertain, unlike the ability to drill down provided by ERP systems such as PeopleSoft.
ERP systems, on the other hand, have a business process focus. ERP systems grew out of the integration of separate materials resource planning (MRP) systems (used to integrate material requirements to production, demand and capacity) and financial accounting systems in manufacturing enterprises. The integration of these functional capabilities into an online and real-time application system, designed to support end-to-end business processes, enables enterprises to plan and optimize their resources across the whole enterprise. Their relational database tables are designed around a complete set of the core functions for an enterprise rather than disparate modules that merely pass transaction data from one module to another.

An ERP environment operates in line with the business—online and in real time. Management has access to online and up-to-date information on how the business is performing. Common and consistent information is shared simultaneously among application modules and among users from different departments. For example, following the implementation of an ERP system, enterprises typically report completion of period or year-end close in one or two days as opposed to two to three weeks under their legacy system environments. Another key change brought about by the implementation of ERP systems is that the systems are owned and driven by business process owners/end users, with the technical support of information technology, rather than being owned and driven by information technology alone.

Enterprises implementing ERP systems can achieve significant benefits, such as:
- Reduction in inventory
- Redeployment of personnel into more value-producing activities
- Productivity improvement
- Order management cycle improvement
- Financial close/cycle reduction
- IT cost reduction
- Procurement cost reduction
- Cash management improvement
- Transportation/logistics cost reduction
- Hardware and software maintenance reduction
- On-time delivery improvement

The intangible benefits delivered by an ERP implementation—while difficult to quantify—can deliver significant business value through improved enterprise capabilities, including:
- Information/visibility (e.g., drill-down capability and consistent, reliable information across business areas)
- New/improved processes
- Improved customer responsiveness
- Integration and standardization of processes, policies, security and controls
- Flexibility
- Globalization
The PeopleSoft system was developed in the late 1980s, focusing on the nonmanufacturing functions of HR and payroll. Since the ERP generation grew out of the manufacturing industry from disparate legacy MRP and financials systems, HR and payroll capabilities may not have been provided by these systems or some of the competitor ERP systems.

The 1990s saw PeopleSoft branching out to develop its financial and distribution modules, while other ERP systems developed their HR and payroll functionality. Although ERP systems have been advertised as “enterprisewide” and “fully integrated,” the Internet revolution has resulted in ERP systems becoming increasingly web-enabled, providing a more flexible and wider-reaching solution to cater to customers, vendors and employees. This globalization of ERP products has brought on additional considerations for the main ERP vendors. PeopleSoft 9 introduced global payroll to cater to a number of Asian countries in addition to the existing support of North America, Canada and a number of European countries. In line with this global rollout, release 9 also has translated versions in Arabic, Czech, Finnish, Hungarian, Korean, Norwegian, Russian and Thai.

The introduction of the euro currency gave rise to the problem of euro conversion. Although most systems are capable of dealing with foreign exchange transactions, enterprises were forced to run multicurrency systems. This is now history. The euro became the definitive currency for the Eurozone countries on 1 January 2002, and all the individual currencies for those countries were consigned to history.

Today, PeopleSoft has more than 10,000 customers in 150 countries running e-business applications, encompassing Human Resources Management, Financial Management, Supply Chain Management and, more recently, Customer Relationship Management modules.

**Major PeopleSoft Modules and Functionality**

Although PeopleSoft may be better known for its HR functionality, it has provided financial applications for almost 15 years. The initial solutions were developed in the early 1990s and were composed of the General Ledger (GL), Payables, Receivables, Assets, Purchasing, Inventory, Billing and Projects modules. Developments since that time have resulted in PeopleSoft financial management applications, providing a more diverse solution with the ability to support e-procurement and business-to-business Internet functionality.

In PeopleSoft Enterprise Financial Management Solutions 9.1, the main modules include:

- Asset Lifecycle Management
- Credit-to-Cash
- Financial Analytics
- Financial Control and Reporting
- Governance, Risk, and Compliance
- Procure-to-Pay
- Travel and Expense Management
- Treasury Management
In PeopleSoft Human Capital Management 9.1 (HCM), the main modules include the following.

**Global Core HCM:**
- Benefits Administration
- Country Extensions
- Employee Self-Service
- Global Payroll
- Human Resources
- Manager Self-Service
- Payroll Interface
- Payroll for North America
- Pension Administration
- Stock Administration

**Workforce Management:**
- Absence Management
- Activity Based Management
- Resource Management
- Time and Labor
- Travel and Expense Management
- Workforce Scheduling

**Workforce Service Delivery:**
- Directory Interface
- eBenefits
- Fusion Middleware
- ePay
- eProfile
- eProfile Manager Desktop
- HelpDesk for Human Resources
- Workforce Communications

**Integrated Talent Management:**
- eCompensation
- eDevelopment
- ePerformance
- Incentive Compensation
- Succession Planning
- Tutor
- User Productivity Kit

The Financial Management Solutions software from PeopleSoft also provides a suite of supply chain management (SCM) applications. These are divided into four main groups: customer order management, logistics, manufacturing solutions, and supply
chain planning. PeopleSoft 9.1 incorporates e-procurement and e-store functionality with web-enabled requisitioning, receipt management and inventory management. These are integrated with the Financial Management modules to further develop and enhance business-to-business capabilities. The main modules include:

- Customer Order Management
- Inventory and Fulfillment Management
- Manufacturing Solution
- Supply Chain Planning
- Supply Chain Warehouse

PeopleSoft provides specific capabilities to cater to industry-specific requirements. In addition, PeopleSoft industry solutions are complemented by subsolutions to provide for the different types of enterprises within an industry. For example, the Financial Services industry solution allows the differentiation of banking, insurance and brokerage firms. Currently, PeopleSoft can be tailored for the following industries:

- Communication
- Consumer products
- Education and research
- Energy
- Engineering and construction
- Financial services
- Healthcare
- High technology
- Higher education
- Industrial manufacturing
- Insurance
- Manufacturing
- Natural resources
- Professional services
- Public sector
- Retail
- Staffing
- Travel and transportation
- Utilities
- Wealth management

The emphasis on Internet capabilities within PeopleSoft has led to the development of a fully integrated customer relationship management (CRM) system linking Customer, Employee, Financial and Supply Chain modules. The PeopleSoft Internet Architecture (described in chapter 9, PeopleSoft Application and Technical Infrastructure) means that no code is retained on the client. Only a standard web browser (e.g., Internet Explorer) is required to access the information, making it more accessible to both internal and external (third-party) users.
CRM aims to track and analyze customer behavior by using information stored in relation to sales and marketing, field service, and help desk and support. PeopleSoft CRM includes:

- CRM Analytics
- CRM Industry Solutions
- Marketing Solution
- Partner Relationship Management Solution
- Sales Solution
- Service Solution

More recently, PeopleSoft has deployed release 9.1 into the marketplace, building on the Internet-based architecture and improving online, real-time collaboration with suppliers, customers, partners and employees. At the time of publication of this guide, the following have been released:

- PeopleSoft Enterprise Customer Relationship Management 9.1
- PeopleSoft Enterprise Financial Management Solutions 9.1
- PeopleSoft Enterprise Portal 9.1
- PeopleSoft Enterprise Supply Chain Management 9.1
- PeopleSoft Human Resources Management (or Human Capital Management) 9.1

The specific audit implications are dependent on the way each of these products is implemented. However, key risk and control considerations will continue to focus on the increased user base (customers, suppliers, partners and employees) and the additional entry points into the PeopleSoft environment, resulting in an increased emphasis on data quality and Internet security to ensure confidentiality/privacy.

As discussed in the executive introduction, this technical reference guide is part of a series of guides intended to be considered collectively; consequently, common business processes and the related risk and control features are not covered in every guide. For example, risk and typical controls associated with inventory and revenue business cycles are considered in the technical reference guide *Security, Audit and Control Features SAP® ERP, 3rd Edition*. This guide covers in detail the key risk and controls associated with the core HR and Payroll products of PeopleSoft release 9.1. However, much of the risk dealt with in the other guides may be applicable to the core functional modules not covered in detail in this guide. For example, the following lists focus on some of the risk associated with the more common applications, such as revenue and expenditure, and these could be considered when planning an audit. These lists should not be considered exhaustive and will be dependent on the implementation and processes within the enterprise.
2. Introduction to PeopleSoft and ERP Systems

Financial Management Solution Risk
Risk to payables includes:
- Changes to the vendor management master data may be invalid, incomplete, inaccurate and/or untimely.
- Master data may not remain current and pertinent.
- If amounts posted to accounts payable do not represent goods or services received, unauthorized payments may be made and the enterprise may incur a financial loss.
- Accounts payable amounts may not be calculated completely and accurately or recorded in a timely manner.
- If accounts payable amounts are not recorded completely and accurately, suppliers may not be paid in full, possibly damaging supplier relations.
- Disbursements may not be recorded accurately, affecting cash flow decisions and causing reconciliation difficulties. The nonrecording of disbursements may also result in duplicate payments.

Risk scenarios to the GL include:
- Invalid journal entries may be booked to the GL.
- Journal entries may be posted more than once to the GL.
- Not all journal entries may be posted to the GL or in the correct period.
- Valid GL account balances may be excluded from the financial statements.
- Financial statements may be inaccurate and may not reconcile to the GL.
- Closing procedures may be inadequate to prevent any further postings to that period and may inaccurately reflect the transactions that took place in a given accounting period.

Navigating the PeopleSoft System

Signing In
The sign-in page requires a user to enter his/her user ID and password, which are both case-sensitive. The language is also chosen on this page, as shown in figure 2.2. PeopleSoft’s online security will validate the user ID and password against the database. PeopleSoft also allows authentication to occur against an enterprise’s Lightweight Directory Access Protocol (LDAP) directory server (e.g., Oracle Internet Directory [OID], Microsoft® Active Directory® or Novell® eDirectory). If either the user ID or password does not match, an error message is displayed, as shown in figure 2.3. Once a user is signed in to the PeopleSoft application, the user profile associated with the user ID determines the menus, pages and action types that the user may access. PeopleSoft security is discussed in more detail in chapters 9 and 10.
Screen Layout and Information

PeopleSoft 9.1 is built on the principles of a client-server, Internet-based architecture, called “pure Internet architecture.” The user environment is completely Internet-driven and can be personalized to the user, depending on whether he/she is an employee, customer or supplier. All screens, called “pages,” are in Hypertext Markup Language (HTML) format.
The PeopleSoft 9.1 graphical user interface (GUI), as shown in figure 2.4, consists of the following:

- **Application portal**—A web site that helps the user navigate to other web-based applications and content. This is usually the entry point when the web browser is launched. This can be customized to include PeopleSoft application, external and intranet links.

- **Navigation header**—The header area in PeopleSoft Internet Architecture (PIA) that remains static as the user navigates through pages. The navigation header contains links back to the initial home page and a sign-out button. The navigation header also has categories, favorites and search features.

- **Page**—The individual display and data-entry screens for each part of the PeopleSoft application. Pages appear in the browser window.

- **Menu**—A navigation list that contains menu headings and links by which a user can move between the pages of the system. The menu will expand and collapse based on a user's selection. The menu interface has been changed so that it now appears horizontally at the top of the screen. Users can still access the full menu by clicking the headings within the navigation path.

- **Component**—A group of related pages that pertain to a specific task. Users access components from the menu. Components contain folder tabs with each tab containing a related page.

- **Keys**—The display-only fields that uniquely identify the data. To display a page, the user enters the keys so the system can retrieve the correct row of data from the database tables.

### Navigating Menus

PeopleSoft provides a number of methods for a user to navigate and access application pages, such as:

- **Menu navigation**
- **PeopleSoft Navigator**
Menu navigation is the default method for accessing menus and pages and is organized around PeopleSoft functionality. PeopleSoft Navigator (or business process navigation) provides the user with a graphical depiction of a business process, designed to represent the sequential tasks and relevant pages required to complete an activity. This provides the user with an overall understanding of the procedures surrounding a business process.

**Menu Navigation**

PeopleSoft’s browser-based interface provides an intuitive way of updating or viewing data in the database. The menu columns are set up as lists of links that enable the user to navigate to the desired component or page. The menu structure is the primary means of navigating the PeopleSoft application. It consists of a series of right-facing triangles with accompanying menu headings. The main column, also known as “home,” contains a general list of the areas in the application. A right-facing triangle before a menu heading indicates that there are sublevels to view under that heading. Sublevels are viewed by clicking the triangle or the menu heading. This will expand the heading, causing the triangle to face downward and reveal any sublevel menu items. A minus sign (-) indicates that the lowest sublevel has been reached.

Menu navigation changed significantly in PeopleSoft 9.1 and subsequent releases. In previous releases of PeopleSoft, the menu was contained in a single column with submenus indented below the parent menu, whereas menus in the current release of PeopleSoft are displayed horizontally at the top of the screen, as shown in figure 2.4.

**PeopleSoft Navigator (Business Process Navigation)**

Another method of navigation is via the PeopleSoft Navigator. As previously discussed, this provides the user with a graphical representation of the steps or tasks and associated pages required to carry out an activity or complete a business process. The Navigator home page is accessed via PeopleTools. It shows the business process map in a tree format on the left side of the screen and the graphical representation on the right side of the screen, as shown in figure 2.5.
The Navigator hierarchy comprises three levels. Figure 2.6 shows the various tree and map icons used.

<table>
<thead>
<tr>
<th>Tree Icon</th>
<th>Map Icon</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Business Process</td>
<td>A complete business task consisting of one or more activities or of other</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>business processes—A business process might include work that is done by</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>multiple users and work that occurs over time in several stages.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Activity</td>
<td>A subprocess of the business task, consisting of one or more steps—Normally,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>activities are made up of steps that are all completed by a single user in</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>a relatively short time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Step</td>
<td>A discrete step in the activity corresponding to a single transaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>executed on an application page or through an external program</td>
</tr>
</tbody>
</table>

**Application Release Number**

It is useful to determine the application release number when performing an audit of PeopleSoft applications. In a browser environment, this cannot be done by the usual Help ➞ About path since this returns the release number of the browser itself. Instead, if CTRL+J is selected on any active page, a new window appears showing the details of the page in which the user is currently working, including the:

- Application release
- Application server
- Browser
- DB name
- DB type
- Operating system of the client machine
- Page
- Page component
- Page menu
- Service pack
- Tools release
- User ID logged in as

Note that CTRL+SHIFT+J might have to be used once or twice depending on the specific browser.

**Executing Commands and Online Pages**

Pages act as the main interface with users for the processing of data in PeopleSoft. Users display, add and update data via the fields on a page. Each page displays related data from one or more tables in the underlying database tables. Action types with regard to user access are discussed in chapter 4, ERP Audit Approach. However, it is appropriate at this stage to introduce the concept of page action options and effective dating, which allow users to work with historic, current and future data.
Effective dating allows changes to certain data to be stored and tracked. When data are changed by a user through a page, the original data are typically replaced in the database by the entered data. However, when the effective date feature is enabled, the original data are retained in the database and a new row is created to hold the new data.

Certain pages have action options in the bottom right corner that define which data will be retrieved from the database. These are:
- **Update/Display**—Retrieves only current and future rows. Only future rows can be changed. A new current row can be added.
- **Include History**—Retrieves all rows. However, changes can be made only to future rows. A new current row can be added.
- **Correct History**—Retrieves all rows and allows any row to be changed and corrected. New rows can be inserted, regardless of the effective date or sequence number. Note that correction mode should be restricted to very few users, if any, since its ability to change data in the past presents a high risk to data accuracy.

### Reporting

There are a number of methods and tools that enable data and analysis of data to be run and viewed by a user. Tools include:
- Standard online reports
- Crystal Reports
- PeopleSoft Query
- Structured Query Report Writer (SQR)
- PS/nVision

PeopleSoft reporting revolves around the submission of process requests via the Process Scheduler and viewing the result using the Report Manager functionality. The process of printing a report has four major steps:
- Selecting the appropriate report
- Entering the required parameters for the report
- Specifying where and when the report is to be run
- Defining the report output type and distribution method

Report activity is accessed primarily through the menu navigation, as shown in **figure 2.7**: Home ➞ Reporting Tools ➞ Report Manager.

All online reports, which are the most commonly used, must have parameters set by the user to define when the report is to be run and its destination, in addition to the content of the report. These settings are recorded as a run control and saved in the database. Run control IDs are associated with the profile/user ID of the user. One user cannot see the run control ID list of another user from his/her own user ID. Users do not have to reenter the report parameters each time the report is requested; instead, the run control ID is entered and the system retrieves the report definition from the database. This applies to both online reports and offline process requests. Process requests are submitted in the Process Scheduler request page. Users are restricted to the type of
processes they are permitted to run by the roles and permission lists assigned to their user IDs. PeopleSoft also provides the capability to select the format of the report and establish distribution lists for the reports, such that the output can be e-mailed to recipients in a variety of formats, including Microsoft Excel® and HTML.

![Figure 2.7—Access to Report Activity](Copyright Oracle® 2011. Used with permission.)

Users will accumulate a number of reports and processes that they run during the course of their job functions. These report and process definitions are held in a personal area within the Report Manager functionality in PeopleSoft. This essentially represents the reports and processes to which a user has access. This list is accessed via Home ➞ Reporting Tools ➞ Report Manager.

**PeopleSoft Query**

PeopleSoft Query provides the ability to interrogate the database to extract data without the user having to write detailed Structured Query Language (SQL) query statements. This is done via the user’s web browser, and the output can be downloaded into a variety of formats, including Microsoft Excel and comma-separated values (CSV).

**The Structured Query Report Writer**

The Structured Query Report Writer is a tool that can extract data from any SQL-based relational database and download data in a prescribed format. A Structured Query Report (SQR) can be used to create tabular, single- or multi-page reports, and form letters and flat files compatible with audit software. In addition, SQRs can be used to update the databases, load and unload tables, and perform interactive queries. Standard SQRs are provided with the PeopleSoft system, and it is possible to customize these to suit the reporting requirements of the enterprise. The standard SQRs are stored in the \PS_HOME\SQR directory. The reports can be output in text, HTML or Adobe® Acrobat® (.pdf) formats. PeopleSoft recommends using SQR for reporting if:

- The user needs the procedural logic of a programming language
- The database data needs to be updated
- Reports need to be run on a server, rather than in Microsoft Windows®
PS/nVision
PeopleSoft provides the PS/nVision reporting tool that can be used to define and deliver reports in Microsoft Excel. PS/nVision offers report formats that summarize information from the underlying databases and also provides a drill-down facility that allows the user to view the supporting details. A report created and designed by one user of a particular business unit can be easily adopted by another business unit without having to define the report parameters. Users working remotely are able to run and view reports via an Internet browser, which still provides for the drill-down facility.

E-mail options allow PS/nVision reports to be sent to individual users or roles. PeopleSoft recommends using PS/nVision when:
1. Users want to build summary reports using aggregate functions, such as SUM
2. Query data and criteria form a matrix of rows and columns
3. The same report layout and corresponding queries need to be used several times (e.g., for a number of different business units)
4. The user requires a drill-down facility to view the supporting details
5. Charts or graphs of the data are to be created

Signing Out
A user can sign out from the system in two ways. Either the user deliberately signs out of the system, or the system automatically signs the user out after a specified number of minutes. The time-out period can be specified at the permission list level via: Main Menu ➞ PeopleTools ➞ Web Profile ➞ Web Profile Configuration: Security Tab.

By selecting the general tab, a parameter can be defined to indicate the number of minutes of no screen activity after which the system will automatically sign the user out, as shown in figure 2.8. An administrator can choose the default Never Time-out option; however, it is important that the Specific Time-out setting be defined, as it ensures additional security. This parameter can also be defined at the web server level.
Fundamental Changes in Business Controls

An ERP implementation and its associated business process changes transform critical elements of the business. Some reasons for the change include the following:

- Decisions taken on erroneous real-time information often are irreversible or costly to set right.
- Batch-oriented controls are not the focus in an online, real-time environment.
- Traditional (paper-based) audit trails are lost.
- Access requirements have expanded vastly to include field personnel and, increasingly, suppliers and customers.
- Master data changes can have a significant impact on transactional data.

As a result, the integrity and control structure supporting ERP-enabled business processes also must be transformed. ERP systems can change internal controls in three fundamental ways:

- **Method of control**—From rechecking and revalidating paper-based records to online monitoring and measurement
- **Point of control**—From multiple validations of transactions, often based on printed outputs and source documents, to a single validation at the point of creation, often an online approval
- **Amount of control**—From many redundant, process-impeding controls to fewer automated, strategic controls

Consequently, it makes enormous business sense to ensure that these enhanced controls are integrated into the reengineered and ERP-enabled processes.
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3. Strategic Risk Management in an ERP Environment

While the implementation of an ERP package may provide significant benefits for an enterprise, it also may introduce new risk and changes in the organization’s risk profile. This chapter outlines:

- Strategic business risk and key management controls
- The importance of establishing a control framework

Key Business Risk and Key Management Controls

In this chapter, the strategic business risk associated with the implementation of an ERP package is described in terms of the following four areas:

- Project management and governance
- Business process/functional
- Application security and technical infrastructure
- Data conversion and program interfaces

Immediately following the description of each strategic risk area is a summary of the key management controls that, when executed, may remove or mitigate the risk. The identified risk may apply to any ERP implementation and is not specific to a PeopleSoft implementation. The benefits resulting from a well-executed ERP implementation may be significant, and the purpose of this chapter is to help enterprises minimize the risk of not obtaining those benefits.

Project Management and Governance

The major concerns for ERP implementations involve organizational issues rather than technological issues.3 This section discusses the risk of and key controls for an ERP project, including:

- Organizational change management and training
- Planning and problem management
- Lack of executive sponsorship
- Reliance on third parties
- Project cost blowout

Organizational Change Management and Training: Risk

Organizational change management and training often rank as the primary areas of risk for enterprises implementing an ERP system.4 During the initial budgeting and business case phase for a project, these areas are often downscaled to reduce costs. However, literature on enterprise systems confirms that failure to address the human and organizational aspects of change all too frequently contributes to poor outcomes in

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2 Deloitte Consulting, ERP’s Second Wave: Maximizing the Value of ERP-Enabled Processes, USA, 1998
such investments. Staff members often defer their involvement in the ERP development, even though it may significantly affect the way they perform their roles in the new ERP-enabled enterprise. In addition, staff members require considerable training on changed business processes and hands-on exposure to the system to adapt to the new processes and systems. An important aspect of change management that is sometimes inadequately emphasized is the role of users and the impact that their actions have on a single integrated enterprisewide application. Another key factor concerns the retention of staff members, once they are trained in new processes and systems. There is a risk of losing key staff members because of the anxiety of the new system/process, thus losing experts who know the business process. Management should take steps to communicate with staff and calm their concerns.

Organizational Change Management and Training: Key Controls
A project sponsor should be established who should ensure that the enterprise has the same vision as the original motivations for implementing ERP-enabled processes—the targeted capabilities and the targeted benefits. Aligning on the true destination (as opposed to the initial go-live phase) is a hearts-and-minds issue which requires special focus on communication, management expectations, education and senior management support. The change management and training program must reach affected people at all levels and provide them with the skills and knowledge required to participate appropriately in the ERP development, understand the changes to their job roles in the post-go-live environment and contribute to the next milestone. Typically, this is not an area where the budget can be trimmed successfully. Enterprises need to establish business process owners and champions who own the business processes and understand the impact of the actions of one group on another. A key success factor for the business process owners often revolves around how early and to what extent they obtain hands-on experience on the new or redesigned processes and the new ERP system. These owners and champions should ensure that the dependencies among processes and modules are effectively communicated.

Planning and Project Management: Risk
Key challenge areas for an enterprise implementing an ERP system include detailed planning and project management of the people, process and technology factors. Approximately 50 percent of the issues and obstacles facing an ERP implementation concern people factors such as:
• Prioritization
• Resource allocation
• Teams/project structure
• Discipline
• Ownership
• Communication

Failure to place sufficient emphasis on these factors, as opposed to process and technology factors, often leads to disappointment with the implementation outcomes.

Planning and Project Management: Key Controls
Enterprises need a strong business imperative to implement ERP systems so their projects do not stop in midstream and end in disillusionment. This imperative needs to be embodied in the business case and carried through to an effective implementation plan and design with appropriate user involvement. Successful projects are guided by detailed work plans, milestone plans and rollout plans. Key dates and deliverables are spelled out, dependencies are synchronized, benefit scorecards are created, and results are tracked and communicated. There is a need for a professional project manager with the ability to:
- Integrate IT and business users into joint decision making
- Facilitate significant and difficult decisions, such as whether to implement processes enabled by the ERP package or whether to implement the ERP package for reengineered or redesigned processes

The bright star of going live—large as it looms at the time—is only a point in time. It is not the point where the full constellation of business benefits is realized. It is the beginning of a journey. Benefits such as improved cost structures, faster response to customers and more effective business processes are why the journey starts, and they should be milestones on the way to the full power of the integrated enterprise. Successful enterprises may miss a scheduled milestone or a date to go live, but they never miss an expected benefit.

Lack of Executive Sponsorship: Risk
Project management and users may become frustrated and effective change may not be achieved if there is no sponsorship or if active involvement of executive management is lacking. Project resources may be redirected to other priorities and the project may stall in the middle. Conflicts may arise between the business areas and IT (or among business areas), and effective resolution may not be achieved. The right level of investment may not be maintained, and the project may lose its purpose.

Lack of Executive Sponsorship: Key Controls
Senior executive buy-in and sponsorship are needed to achieve the right mix of business and IT involvement in the project and to resolve conflicts. Business process reengineering needs championing, and systems architecture needs investment. Risk must be managed and business controls must be designed and deployed effectively. To succeed, these aspects need executive support. During implementation, the responsibility for going live on time and on budget usually rests with the project lead. However, going live is only an interim destination. In successful enterprises, there is no mystery about the accountability for results. An unambiguous responsibility and accountability should be set up for the benefits of the project and this should be communicated to the entire enterprise.

Reliance on Third Parties: Risk
While consultants bring valuable experience and methodologies to a project, their presence alone does not guarantee success. The enterprise may overly delegate to consultants or third-party suppliers of ERP solutions, expecting them to intuitively know their business requirements and effectively test and implement the solution. A
major pitfall may also involve the payment of large sums of money on the delivery of documents, such as designs and flowcharts, without any tangible delivery of the computer system solution. Often, enterprises focus so much on going live as the end product, that the need for a postimplementation stabilization phase and benefits-realization phase are ignored or not well understood. This results in the consultants or the project team being let go too early, skills and knowledge not being effectively transferred to the enterprise, and inadequate support being available in the postimplementation environment. Another consequence of funding or remunerating consultants upon going live may result in the enterprise being pushed to go live irrespective of its readiness.

Reliance on Third Parties: Key Controls
Business process owners who understand the enterprise and its business requirements need to be appointed. These business process owners must gain hands-on experience with the solution and champion the cause to ensure effective testing and implementation of the solution. The enterprise needs to contract effectively with its suppliers to ensure the quality of deliverables and effective postimplementation support. This may take the form of warranties or retainers until the delivered product is proven in production. Effective transition planning and training are required to transfer skills from vendors or consultants to appropriate staff. Retention plans are required to ensure that staff members, once trained and marketable, remain with the enterprise. Each key member of the team should have a backup staff member with similar training and experience.

Project Cost Blowout: Risk
Some of the major causes of project cost blowout have been discussed already. These include change management, training and a lack of software functionality. In addition, the customization and integration of software packages can make up a considerable component of total implementation costs. Changes to the vendor-supplied software or customizations usually build in upgrade costs since additional testing of the changes is required during the upgrade. Generally, it is better not to customize. However, the enterprise needs to be sure that the vanilla solution can handle the major parts of its business. Other areas that are often underestimated include program interfaces, data conversions, report changes, integration testing, process rework and consequent increases in consulting fees. Unexpected project costs also may be hidden in business-area desktop computing budgets or in other IT infrastructure budgets.

Project Cost Blowout: Key Controls
The nature of the change management and training challenge (involving an understanding of the integration among business areas, the data flow through the enterprise and the impact of one area’s actions in the system on another) that accompanies an ERP implementation needs to be presented to, and understood by, executive management. These programs need to be targeted and funded appropriately. Project cost overruns need to be identified early through effective reporting to the appropriate governance mechanism.
The business case should not be a static, one-time exercise intended to secure funding. On the contrary, the business case needs to be a dynamic and evolving management tool—one that should live beyond the go-live phase through the benefits-realization phase. Successful enterprises use the business case tool in a variety of ways, including:

- Justifying the program
- Validating the design
- Setting postimplementation targets and managing them
- Prioritizing postimplementation change initiatives

Too often, the business case for an ERP implementation consists of a high-level mission statement or description of intangible, unquantified business benefits. A proven business case template should be employed and tailored to the enterprise’s environment. Factors that should be considered include:

- Total cost of ownership, factoring in, for example, the additional cost of upgrading as a result of making software customizations
- Appropriate due diligence in determining benefit and cost items involving the input of variables and formulas for determining inventory, people savings, and conversion and integration costs
- A cash flow analysis, including appropriate risk factors and cost of capital

Measurements need to be initiated in the legacy system’s environment to baseline costs and benefit streams so the improvements in the postimplementation ERP environment can be measured effectively.

**Business Process/Functional**

**Business Process Reengineering: Risk**

For users who are familiar with the functional orientation of a legacy system environment, it can be challenging to embrace the notion of an integrated ERP environment based on business processes. As with any integrated environment, errors in one part of the process may have effects throughout the processes. Reengineering of the business processes will most likely result in structural and job role changes within the enterprise. Staff members who worked within the legacy environment for an extended period of time may find it difficult to adapt to new roles and, as a result, certain business functions may not be properly performed in the postimplementation environment. Also, there is a risk that the reengineered business processes may not have been configured properly, resulting in incorrect processing (e.g., incorrect tax indicators) or inadequate business controls (e.g., three-way match on purchases being bypassed).

**Business Process Reengineering: Key Controls**

The change management and training program needs to provide users with an appropriate overview and understanding of the impact of their actions on the process, system and others. Users need to be trained sufficiently, and the appropriate procedural controls need to be defined so users are able to execute their new roles in the new and integrated processes and system on the first day of going live.
Enterprises, even those successful at implementing ERP systems, usually experience a temporary dip in performance after going live. Going live with ERP is a significant change for any enterprise. The dip will vary among enterprises, depending on how well they were prepared for the introduction of the new system. Most users need to walk before they run, and after mastering the basics on the live environment, they may require refresher training on the more advanced topics. The enterprise needs to be prepared for contingencies and the considerable effort often involved in correcting errors made in an online, real-time environment. This may require additional trained data entry or programming resources to correct data errors.

Configurable options need to be explained thoroughly to users and documented appropriately in the business requirements, design or blueprint documentation. Changes in the system of business controls need to be considered early in the implementation process and included in the design to minimize the cost of retrofitting controls at a later time.

**Software Functionality: Risk**
Enterprises often find when they get down to the detail—or worse, when in the production phase—that the ERP solution cannot handle the major parts of their businesses. While the enterprise perceived that the vendor or reseller said that the solution could meet the business requirement, the requirement may not have been clearly specified or effectively detailed. Whatever the reason for the misunderstanding, if there is a fundamental mismatch between the system and the business need, the consequences may be costly.

**Software Functionality: Key Controls**
Management needs to take the time needed to effectively complete its due diligence on the new system. Appropriate software selection guidelines should be utilized, and factors to consider include:
- Others in the industry using the solution
- Particular local requirements
- Legislative or compliance requirements (e.g., tax, statutory reporting, industrial awards/agreements)
- Foreign currency handling (e.g., financial vs. management accounting treatment and reporting through time on a transaction and across country borders)
- Particular reporting requirements (e.g., external reporting and reconciliation needs)
- Impact that the loss of specific legacy system functionality may have on customer service (Caution needs to be exercised prior to replicating legacy functionality; only if it is the best, or at least the better, process should the enterprise consider replicating it. It should not be replicated only because the enterprise is used to it.)
- Stability of the current software release
- Specific operational needs (e.g., handling fresh produce or livestock)
- Marketing needs (e.g., bulk discounting across product lines)
- Significant savings of both time and money (e.g., new software versions with features more aligned with business processes would require fewer application customizations)
Further along in the implementation, adequate user acceptance, system and integrated testing need to be performed to ensure that the system performs as anticipated. System performance is another critical area that must be tested to ensure that the application and the related infrastructure can handle the typical transaction loads processed by the enterprise.

**Application Security and Technical Infrastructure**

**Single Point of Failure: Risk**

Within the legacy environment, the impact of a component failure within a system has limited, if any, impact on other systems. This is so, even in the case of a total loss of a particular application system. For example, a purchasing system could, in most cases, be managed through manual workarounds. In an ERP environment, where the whole enterprise may be reliant on the system, the loss of the system for any extended period of time is likely to have significant effects on the enterprise’s operations and significant financial implications.

In the legacy system environment, systems could typically be unavailable for a few days before offsite and contingency facilities had to be invoked. In an ERP environment, the period of time between the point when the system is unavailable and the point when the contingency plan needs to be invoked is typically measured in hours.

Because the enterprise has moved to operating in an online, real-time mode, its business operations may be disrupted when the system is unavailable. For example, a distributor of perishable food went live with its ERP system, utilizing a legacy front end that processed orders from field personnel using handheld devices. The process consisted of field personnel entering data into a legacy front end that, in turn, updated the ERP system’s back-end. When the front-end legacy system failed—unable to handle the volume of data—the enterprise was forced to use manual data entry for orders completed by field personnel. The customer service personnel, with no experience in entering orders, made errors when entering the data. Orders were incorrect and out of sequence, and this played havoc with the back-end warehousing operations of the business. The warehousing personnel, also new to the system, had considerable difficulty dealing with incorrect order details, returns and corrections. Incorrect deliveries were made, inventory information became inaccurate and the entire episode resulted in a significant write-off.

At the core of the PeopleSoft system is a single relational database. This database utilizes complex technology to ensure that it can feed the system the necessary information to complete all business processes. The complexity of the database and the amount of information that is fed into and extracted from it requires careful controls to be instituted.
**Single Point of Failure: Key Controls**

Business continuity management plans need to be revised, taking into consideration the ERP system as a single point of failure. Four characteristics of ERP systems that may impact business continuity planning (BCP) are:

- The large number of modules that cover a broad range of the enterprise’s business processes
- A large, integrated database
- The physical and logical intertwining of all modules and data, which may necessitate recovery at the same time
- An increase in the direct interface among ERP suppliers and other third parties

Because of these characteristics, rapid recovery may necessitate a complete redesign of the enterprise’s BCP arrangements.

Another point to consider is that an online, real-time system also needs an online, real-time business environment that can effectively monitor and deal with exceptions before they turn into significant problems and impact other areas. System maintenance and version control also are important in terms of maximizing system availability and integrity.

**Distributed Computing Experience: Risk**

Although it is sometimes overlooked, the IT architecture may be totally overhauled with the implementation of ERP. The enterprise may move from a centralized mainframe environment to a distributed client-server environment. New skills are required to manage and maintain this environment, and the impact of this change is often underestimated.

**Figure 3.1** illustrates how complex an ERP technical environment can become. This environment is indicative of the environment on which PeopleSoft applications and legacy applications can be run (a client-server computer architecture). Depending on the IT architecture used in the implementation, the audit may be centralized or decentralized. Extra care needs to be taken in scoping the first-year audit of enterprises that have implemented ERP systems. In this type of environment, there is often a combination of centralized accounting controls and decentralized operational controls.

**Distributed Computing Experience: Key Controls**

The IT infrastructure requires the same planning as the business processes. IT staff may require training and may also need to develop new skills. These areas are often underestimated in the initial planning for an ERP implementation. IT staff may become extremely marketable following training in the new environment and, for that reason, it is advisable to consider retention and succession plans.

**System Access: Risk**

Bringing a number of the enterprise’s applications together into one enterprisewide application potentially gives users more access to additional information and processing functions. Recent releases of certain ERP systems are designed to allow wireless or
remote access for field and sales staff and, if necessary, for customers and suppliers. This level of direct access to the system from remote locations allows the system to be kept up to date in real time. Yet, increased remote access may create an environment in which the system is far more susceptible to hacking or other malicious tampering. It may also increase the likelihood that incorrect data are introduced into the system.

**System Access: Key Controls**

PeopleSoft contains a number of security parameters covering passwords, intruder lockout, super user access, etc., that, when set appropriately, serve to secure the system. Other ERP systems have varying degrees of security functionality; some require add-on packages to adequately secure them. User access to the system should be designed and built in accordance with the enterprise’s security policy or needs. Some of the factors to be considered include the:

- Segregation of access/duties
- Provision of access to only the transactions or objects required by users to perform their jobs or process roles
- Provision of access based on risk assessment of the consequences of providing the additional access vs. the cost of implementing tighter security (e.g., access to view all plants vs. maintaining separate security profiles for users in each plant)

Security is covered in greater detail in chapter 4, ERP Audit Approach.
Data Conversion and Program Interfaces

Data Quality: Risk
As an ERP system may be reliant on a single, central database, the integrity of the data within it is paramount. Data fed from legacy systems may be inaccurate, incomplete or duplicated, resulting in operational difficulties in a more automated and integrated environment. For example, a higher education institution converted its supplier master file, complete with fax numbers for each supplier. In the new ERP environment, the institution moved to online faxing of purchase orders on approval by the appropriate delegated authority. Because some of the fax numbers were out of date, a number of faxes were misdirected or lost. Further, the enterprise had implemented the ERP solution with third-party middleware and was unable to receive fax completion or OK messages without logging off of the ERP system and logging on again. Data can also be locked away in the complex data structures of ERP systems. Finally, as e-business opportunities increase and prevail, the ability to unlock the data within the ERP will become increasingly important. Data quality is also becoming more important in the e-enabled ERP environment, as external parties access invoice and financial information via the Internet.

Data Quality: Key Controls
All data should be effectively cleansed prior to loading them into the enterprise’s ERP system. Cleansed information should be secured while awaiting conversion to the ERP environment. Control techniques, such as control totals (often embodied in ERP conversion and load utilities) and data editing criteria, should be employed as appropriate. Mock conversions should be performed and financial reports reconciled between the two systems during the mock and final conversions to confirm the completeness and accuracy of the data conversion. Data conversion is an area of key importance for an enterprise and its auditors.

Program Interfaces: Risk
While ERP systems enable many different types of functions to be completed, some enterprises have requirements that are not met by an enterprise application program or need to transfer information with suppliers, customers and financial institutions. As a result, program interfaces are established to transfer transactional information among these systems. If interfaces are not controlled effectively, there is a risk of inaccurate, incomplete, unauthorized or untimely information being fed into the ERP system or extracted from it.

Program Interfaces: Key Controls
Controls over program interfaces are similar to those operating over data conversions, except they may be performed in an interactive manner rather than in batch mode. Further, the timing of the program interface can often be significant, particularly where there are a number of program interfaces that must be executed within a short processing window.
The Importance of Establishing a Control Framework

A control framework for an ERP environment can create a robust management tool and methodology for ascertaining the risk associated with an ERP environment and a standard for defining the established controls. This can be achieved by:

- Establishing an organizational control framework
- Defining the control framework for an ERP environment

Establishing an Organizational Control Framework

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) developed a model for evaluating internal controls with the objective of helping organizational management improve its entity’s internal control systems and provide a common understanding of internal control among interested parties. This model has been adopted as the generally accepted framework for internal control and is widely recognized as the definitive standard against which enterprises measure the effectiveness of their internal control systems. The framework defines internal control as:

…a process, effected by an entity’s board of directors, management and other personnel, designed to provide reasonable assurance of the achievement of objectives in the following categories:
- Effectiveness and efficiency of operations
- Reliability of financial reporting
- Compliance with applicable laws and regulations.

The framework defines five interrelated components of internal control:
- Control environment
- Risk assessment
- Control activities
- Information and communication
- Monitoring

The COSO framework is an effective starting ground for defining an enterprise’s internal control framework and methodology with regard to an ERP environment. It can then be used for defining the elements of a control environment that are specific to an ERP implementation.

Defining the Control Framework for an ERP Environment

The implementation of an ERP system can introduce new risk and alter an enterprise’s risk profile. As a result, an enterprise needs to redefine its approach toward risk management and control assessment to cater to the different risk in an ERP environment and achieve complete coverage of the associated management controls. A framework is required to facilitate the assessment of risk and the completeness of controls. There

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COSO, Internal Control—Integrated Framework, USA, 2004
are several frameworks that can be adopted to model the ERP control environment. One that is consistent with the ERP business process-driven approach and works well in practice is outlined in figure 3.2.

The control framework consists of the following five areas:

- **Business process controls**, which include automated (e.g., online approval, three-way matching of purchase order amounts, goods receipt quantities and invoice particulars) and manual controls (e.g., reconciliations, manual approvals, review of exception reports) within the reengineered business processes. Business process controls are most cost-effective when incorporated from the beginning of the project throughout the design and development phase. Retrofitting controls after the implementation is often costly.

- **Application security**, which includes maintenance of roles and permission lists that provide access to application functionality and system services. It includes user, system and security administration procedures, and it incorporates the setting of security parameters (e.g., password lengths) and the granting and removing of user access to the PeopleSoft application system.

- **Program interface and conversion controls**, which also need to be considered within the framework to address the risk associated with converting or interfacing data from legacy or external systems

- **Technology infrastructure**, which includes controls surrounding the technology platform on which the application resides. The technology infrastructure consists of the servers, operating system, database and network layers.

- **Project management**, specifically the aspect of the control framework relating to change management and project disciplines discussed in this chapter in the Project Management and Governance section.
Summary

This chapter outlined key risk and controls associated with the implementation of ERP systems. Key risk includes change management, cost blowout, single point of failure and data conversions. Associated key controls include executive sponsorship, training, backup and recovery, data cleansing, and control totals. This chapter also introduced the increased emphasis on governance and the importance of establishing a framework of internal control. This led to a conclusion regarding the need for enterprises to redefine their approach to risk management in an ERP environment and the importance of establishing a control framework to facilitate the assessment of risk and the completeness of controls.

Pages 34 through 282 have been deleted from this excerpt. Please visit www.isaca.org/PeopleSoft-3rd-Ed for information on how to obtain the book.
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