Estimating the Time and Cost of ERP Implementation Projects Is a 10-Step Process

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Many critical time and cost areas associated with implementation activities are often overlooked in estimation efforts. Use Gartner's 10-step process to produce a reliable estimate of the costs and duration of implementation projects for ERP.
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**ANALYSIS**

Organizations implementing ERP systems are at high risk of project cost overruns and missed deadlines. For 40 percent of organizations deploying ERP systems through 2009, the actual time and money spent on these implementations will exceed original estimates by at least 50 percent (0.7 probability).

Many organizations have suffered project failures because of unplanned or under-planned implementations. A key component of the planning required to avoid such failures is the development of a reliable estimate of implementation project costs and duration. This process must go beyond simple "rule of thumb" metrics and vendor cost promises. Organizations must produce an accurate estimate of — and a detailed work plan for — project costs, duration and resource needs before the implementation process begins.

Use Gartner's 10-step process to produce a reliable estimate of the costs and duration of implementation projects for ERP. A range of critical time and cost areas are associated with implementation activities, many of which are often overlooked in estimation efforts. They include:

- Process design
- Core and supplemental staffing needs
- Data conversion
- Customization and interface development
- User training
- Project management
- Organizational change management
- Pilot deployment and rollout to remote sites

Not only will this 10-step process provide significant assistance in producing a reliable estimate, but the information gathered during the process will also form the foundation for detailed work-planning activities. The statements of work, estimates and assumptions generated can be carried forward into the development of a detailed implementation work plan and then fed back into the ERP business case. This 10-step approach is based on the assumption that the ERP system being implemented has been selected through a robust evaluation process — one that identifies not only the specific application scope, but also critical functional deficiencies and interfaces. The key to ERP project success is diligent estimating, planning and control. By following our 10-step process, organizations can help ensure that they do not fall victim to time and cost overruns that cripple implementation efforts — if not cause outright project failure that results in the inability to deliver identified benefits or predicted returns on investment.

Estimating the cost and duration of a packaged ERP software implementation is a complex process with many variables. Simplistic ratios (that is, for every dollar spent on software, plan to
spend two dollars on implementation, or implementation cost is $20,000 per licensed user) are unreliable. Gartner believes that the best way to estimate full implementation costs is through a thorough cost estimate and detailed work-planning process. The following estimation process is designed to provide a cost and timing estimate for ERP that falls between simple estimates and robust work plans. Statements of work, estimates and assumptions generated as part of this exercise should be carried forward into detailed work-planning activities.

Our 10-step process will assist in developing a reliable implementation service cost estimate for an ERP implementation project. Most of this process will take place after the ERP software has been selected. Although initial scope definition, data conversion steps and interface estimates can be performed while software evaluation is in progress, the rest of the steps depend on the completion of the software selection process. Note that some form of the project scope defined in Step 1 must be in place prior to software selection. This scope should be refined through the selection process and finalized at the start of the implementation planning process.

This framework does not attempt to include costs for application software, hardware, system software, networking technology, ancillary application software, or PCs and peripherals. It excludes costs for the creation and implementation of an ERP competency center. Service-oriented architecture (SOA)-based ERP implementations are also not addressed here. Although the steps in this process will not change for SOA, the time scales may — sometimes significantly. Estimating SOA-based ERP implementations will be covered in subsequent Gartner research.

1.0 Define the Scope of the Project

- **Process and Function Scope:** Document the functions and processes of the business that need to be addressed by the implementation project. Each macroprocess should be decomposed into lower-level components. ERP components (or "modules") should then be mapped in support of each process or function. Take a process view of the project, because components are tightly integrated along process lines. In addition, be sure to note areas that are "out of scope" to set baseline expectations and clear up assumptions about what will be included in the project.

- **Location Scope:** Determine which locations will be included in the implementation project. Develop a matrix in which processes and functions are cross-referenced with the locations where they are performed.

- **Legacy System Scope:** Create a complete inventory of legacy systems and determine which will be replaced by ERP and which will be interfaced to it. Systems that will be replaced are potential repositories of data for conversion efforts.

1.1 Typical Macroprocesses Identified as Part of an ERP Implementation

- **Order to Cash:** This area encompasses the sales department's order-to-cash process and may be bracketed by sales opportunity management (prospect) and post-sales service (care).

- **Requisition to Payment:** This area encompasses the procurement process and includes e-procurement capabilities.

- **Planning and Execution:** This area encompasses the processes for planning resources (such as material, cash, labor, transportation, personnel and maintenance), executing the plan and controlling the resources used to execute the plan.
• **Plan to Performance**: This area encompasses the financial processes that go beyond payables and receivables to include consolidation, budgeting, treasury and financial reporting.

• **Design to Retirement**: This area encompasses the process of the product/service life cycle from conception to retirement.

• **Hire to Retire**: This area encompasses the processes that support workforce-related issues for HR and non-HR business processes.

### 1.2 Sample Process Decomposition

Each macroprocess should be decomposed into the lower-level processes it contains. For example, the “requisition to payment” process can be decomposed into five main subprocesses:

- **Requisition Creation and Approval**: The creation, routing and approval of the requisition
- **Purchase Order Creation and Approval**: The placement of the order with the selected supplier
- **Goods Receiving and Quality**: Recognition of the delivery of required goods or services, and assurance of quality
- **Invoice Receipt and Matching**: Receipt of the supplier's invoice, and confirmation that it matches the agreed-to delivery and pricing
- **Supplier Payment**: Payment of the invoice per agreed terms

A helpful exercise during this activity is to collect a list from each functional area of the tasks and transactions performed as part of the business function. Map this list to the lower-level processes to determine where the tasks fit. For tasks that don’t fit into the lower-level process list, determine whether they are out of scope or whether a new lower-level process is required. This forms the route map for future project activities, such as user training and organizational change planning.

The subprocesses may vary depending on business rule variations, and the variation should be accounted for when estimating implementation effort and cost. For example, purchase order creation may contain different steps depending on order type — for complex orders (procure network services), there will probably be a bid and request for quotation step.

### 2.0 Estimate Staffing to Lead the Project and Support Each Process Area

Note that the estimates developed in the following steps do not include supplemental staffing requirements, which are covered in Step 7 (see Section 7.0). They also exclude the resource cost calculations covered in Steps 9 and 10 (see Sections 9.0 and 10.0).

**Estimate program management and quality assurance resources.** Estimate the full-time resources — internal and external (that is, from within the enterprise and from consultants or service providers) — that will be required for project management, quality assurance and guidance. Internal audit personnel should be included. Assume at least one internal project manager and one quality assurance person for the life of the project. Larger projects may require program managers and project office staff.

Projects also require governance mechanisms that need staffing. The project’s steering committee should be comprised of senior stakeholders from the business who are empowered to...
make final decisions with regard to the project. The steering committee may meet as frequently as once a week, and, depending on the size of the organization, may range from four people to more than 10.

**Estimate project team leadership.** Assume that each major process (defined in Step 1) requires an internal and external team leader (or process owner). These team leaders will perform the dual roles of leading their teams and addressing the business process requirements from process design through application configuration, testing and rollout.

**Estimate change management staff.** Assume that at least one change agent will be part of the program management team. For large organizations, assign additional change agents for every two major process areas (defined in Step 1). For projects with significant cultural or process change requirements, assume one change agent per process, at a minimum.

**Estimate functional and process staff.** Assume that one full-time user will be needed for each business process that is in scope, and that one consultant will be required for every two to three of the application's functional modules. This positions users as enterprise subject-matter experts, and consultants (who have more package and process competencies) as application specialists with a more integrative role on the team. This also creates a team with the skills most appropriate to configure the application to the needs of the business. Plan on backfilling the users that are assigned to the project. Backfill those users for the life of the project.

In addition to the full-time team members, identify other users who will participate in specific project activities, such as reviewing and validating the vision, and designing and configuring the system. In multisite organizations, this is critical to ensure that each site has an opportunity to influence the design by representing their site-specific requirements. For large, multisite or multinational implementations, assign additional full-time team members from these various sites to ensure that requirements are met.

To determine the appropriate number of secondary resources that should be attached to the team, users should create a simple matrix that charts locations against processes. The body of the matrix is populated with the names of resources assigned to the project full-time and part-time. This creates a simple reference framework to ensure that all site requirements are represented to the project team. The matrix document should form a formal part of the project's documentation and should be signed off on according to the project's governance mechanisms. If a site chooses not to provide a resource, even part-time, this matrix documents the site's deferral to the resources from other sites.

**Estimate technical resources.** These include staff for application installation and maintenance, database administration, networking, middleware support, Internet/intranet and PC support, and security. Include internal and external technical team leaders. This portion of the technical team should be skewed toward internal resources, but all required skills must be covered.

Where external resources are required, internal personnel should be assigned as "shadow" resources. In resource shadowing, an inexperienced internal resource is linked with an experienced external one, so the shadow resource can learn from the external expert and expedite the knowledge transfer process.

If the project is introducing new technologies into the organization, then an IT skills audit should be performed to determine what, if any, skills in the new technologies exist in-house. Training plans should be developed based on the skills audit, and executed as part of the project's implementation.
3.0 Estimate Custom and Interface Development Efforts

3.1 Custom Development

Identify critical functional deficiencies and estimate the customization needed to address them. These functional "gaps" should be an output of the software selection process, and should be carefully managed so that unnecessary customization is avoided (see "Customizing Packaged Applications: Where and Why"). Custom reports should be included in these estimates. All customizations, including reports, should be thoroughly questioned and justified before development, because any customization will add cost and complexity to upgrade to subsequent versions.

Estimation of the customization effort required to address functional deficiencies should be performed by developers experienced with the ERP vendor's development tools and environment. This skill will not reside within the organization and must be obtained from external resources. Each estimate should include a statement of scope, conceptual design, duration to complete and required staffing.

To gain an understanding of the magnitude of the development effort, separate custom components into three categories: easy, moderate and complex. Develop an estimate for each category (for example, "easy" requires one programmer for two weeks and a functional team member for three days). Apply the time estimates to the list of customizations to gauge the magnitude of the customization effort.

Custom development efforts are typically staffed by internal and external resources, with a resource mix that is roughly 75 percent external and 25 percent internal. This mix enables the knowledge transfer from experienced developers to the resources that will be responsible for the ongoing support of the application.

3.2 Interface Development

Identify legacy interfaces and estimate interface development requirements. These interfaces should be clearly documented, and estimates should be developed jointly by legacy system programmer/analysts and ERP system developers. Each estimate should include a statement of scope, duration to complete and required staffing. An estimation process similar to the process defined for custom development should be used for estimating the interface effort. This staffing is typically composed of a 50/50 mix of internal IT and external resources to ensure that the requirements and constraints of ERP and legacy systems are considered, and to provide continuity with internal staff after the external resources leave.

4.0 Assess Data Conversion Magnitude

The key drivers of data conversion are:

- The number of tables populated
- The quality of the legacy data
- The mechanism for conversion (such as automated scripts or manually generated scripts)
- The amount of history converted
- The number of legacy systems being replaced
ERP systems hold data at four levels: code tables, master data tables, transaction tables and balance tables. All four of these levels should be analyzed, because different conversion strategies are appropriate for each.

4.1 Code Tables

Code tables contain data used to define other information. Examples include currency codes, customer groups, commodity codes and units of measure. These tables contain data that is static and — rather than being the subject of a transaction — is attached to the transaction for later reporting purposes.

Code tables are frequently populated manually because legacy systems' data structures don't align with those of ERP systems. Determine which code tables are required to support the project scope defined in Step 1 and estimate the time required to determine the appropriate usage strategy. Estimate the time to load and validate the tables. Should more than one set of codes be required to support multiple configurations? Increase the estimates incrementally for each variation.

Code tables are not always converted. Analyze the code tables to determine what must be converted, what is delivered with the new application and what may be loaded as part of a package configuration.

4.2 Master Data Tables

Master data tables define certain entities (for example, customers, employees, bills of materials, products, pricing and charts of accounts) involved in business transactions. These tables contain data that is mostly static but subject to regular maintenance. Master data tables are converted programmatically from legacy data. In some instances, new or additional master data is required. This must be manually loaded or programmatically generated. Estimate conversion efforts for each master table required to support the scope defined in Step 1. These estimates should cover the following activities:

- Data cleansing
- Mapping legacy data structures to ERP data structures
- Data extraction from legacy
- Translation of data to new codes
- Loading data into the ERP system, validating the results and resolving discrepancies

These conversion efforts are light to moderate in complexity. However, if the data converted comes from multiple legacy systems, then the complexity of the effort will increase in direct proportion to the number of legacy systems involved. Data that comes from a packaged legacy system will often simplify conversion efforts, while data that comes from an in-house-built system that has evolved over time (that is, data elements have been reused with different definitions for the same codes) will typically complicate conversion efforts. This type of data is often of questionable quality and the cleansing effort takes longer than expected. If the quality of data is suspect, then plan on encountering difficulties during the conversion effort.

ERP implementations often involve a change in the chart of accounts. Additionally, many large organizations have more than one chart of accounts in use within the legacy systems. If changing the chart of accounts or multiple charts of accounts is in use, then plan for the added complexity in data conversion efforts.
4.3 Transaction Tables

Transaction tables contain information related to discrete business events. "Sales order header" and "sales order lines" are examples of transaction tables. These tables change as a result of each business transaction. Transaction tables are candidates for programmatic conversion. These conversion efforts can be complex, because the data structures within the ERP system will differ significantly from the legacy environment, making it difficult to map fields. Because the data represents large volumes of historical data, carefully consider whether the detail is truly needed in the new system. Before moving transaction-level information, determine if the relevant history can be accessed through the legacy system or other reference devices.

As with master data tables, estimates must be made for data cleansing, mapping, extraction, translation and loading into the ERP system. Include time for validating the converted data. These conversion efforts are moderate to high in complexity. The estimates are affected by the number of legacy systems and the amount of data (for example, the number of years' worth of data and of active vs. inactive accounts) being converted.

To gauge the effort required for conversion, start with the number of tables that need to be converted manually or programmatically. Apply a "complexity" factor to each to produce an estimated time to develop. Add to this the number of different versions of the table required (for multiple configurations), as well as the number of different legacy systems that data is being converted from. If data quality is suspect, then add some time to address conversion errors. Add time for developing custom validation reports, if needed.

4.4 Balance Tables

Balance tables hold aggregated transaction data created by the system as it aggregates transaction activity. These are an important consideration in data conversion because they may be leveraged to convert historical summary information without the supporting detail transactions.

As with master data tables, estimates must be made for data cleansing, mapping, extraction, translation and loading into the ERP system. Include time for validating the converted data. These conversion efforts are moderate to high in complexity. The estimates are also affected by the number of legacy systems and the amount of data being converted.

5.0 Estimate Project Duration

Time estimates must be developed for all phases of the project — as well as for the planning and preparation that precedes the project, project management efforts and organizational change management activities that span its phases. In the following sections, we examine each of these areas in detail. The analysis below assumes a fairly broad, integrated implementation that focuses on:

- The creation of a standard, enterprisewide solution (corporate kernel)
- Piloting the standard solution at a specific site
- Validating and updating the standard solution based on pilot results and findings
- Rolling out the standard solution to the remainder of the enterprise

Although the approach below is representative of an average implementation process, significant variances can occur. For example:
• The creation of a global, standard solution will take more time, because more parties must buy into the process. Conversely, decentralization, or the creation of multiple solutions (requiring multiple configurations and instances), will increase time and effort as well because design and configuration work will be repeated in every implementation.

• International requirements will complicate the design, because regional statutory and legal requirements must be considered for all involved locations.

• The implementation of a new version of an application (that is, one that has been generally available for less than six months) may require additional time for configuration and testing.

• The implementation of a specific module of ERP, as opposed to a full suite, will use a similar method with much shorter durations.

• In a single-site implementation, the standard solution design will be achieved more quickly, and Phase 4 (see Section 5.5) will not be required.

5.1 Project Planning and Preparation

Time must be allocated for the planning and preparation activities that take place before the implementation project begins. These activities typically take one to two months, but can last longer with complex implementations with numerous business partners or sites involved. Project managers must collect the results of the planning activities and publish them in the project charter and the associated project plan. The charter (also known as the "project initiation document") defines the project on many fronts and acts as the overall contract between the project team and the business. Project managers must clearly define and document each section of the charter before the project can begin. The charter typically includes the following sections:

• **Scope:** Processes, systems and locations.

• **Timing:** A high-level timeline of the project.

• **Approach:** The methodology behind the project.

• **Resources:** The project organization (based on results of Step 2).

• **Roles and Responsibilities:** Details concerning who is responsible for what.

• **Assumptions:** Specific requirement assumptions and positions on potential unknowns.

• **Risks and Mitigation Strategies:** The risks that could affect project success and strategies to address them.

• **Project Status Reporting Approach:** Who receives project status reports, in what form and how often.

• **High-Level Project Communication Approach:** The strategy for communicating with all project stakeholders.

• **Change Control Strategies and Processes:** Controlling changes to project scope.

• **Decision-Making Strategies and Processes:** Defining escalation policies and where final decision-making authority lies.

• **Issue Management and Resolution Strategies and Processes:** Defining the project approach to identification, tracking and resolution of uncovered issues.
• **Organizational Change Management Approach:** The strategy for implementing the changes the project will bring to the organization. The detailed project communication plan and training requirements and plans form part of this document.

Project preparation includes the creation of the project environment, including technical infrastructure, project team infrastructure (such as e-mail and shared servers) and the team’s work environment. Depending on the size of the team, the build-out of the project team’s work environment may constrain the start of the project. Co-location of the project team is vital — especially in multisite or international implementations. Travel costs for team members to co-locate should be factored into the project’s overall cost.

**5.2 Phase 1: Standard Solution Design**

In this project phase, the initial configuration of the ERP system is developed based on the broad requirements of the enterprise. Typical activities include:

- **Core Team Training:** Training the core team in the broad capabilities of the ERP system. Depending on the scope of the implementation, it may be appropriate to bypass publicly available training in favor of tailored training that is targeted at specific enterprise requirements and business processes.

- **Current-State Process Review:** Documenting and understanding the workings of the enterprise — focusing on processes that vary among locations — that are industry-specific and contribute to competitive advantage. Avoid excessive documentation of current-state processes, because they will be replaced by new package-enabled processes. However, it is critical to develop a master list of the current processes and transactions that will be replaced (that is, what to configure, new procedures, test scenarios, user training components and organizational change requirements), because this forms the foundation for the rest of the project. Some of this documentation may have been done as part of the selection process. If this is the case, a review of the documentation should be performed to ensure that it is up to date.

- **Multisite Design:** Documenting the initial design strategy for the support of multiple sites. Will one instance be used or many? How will data be synchronized across the organization? What data elements and processes must be standardized or centralized?

- **Process "Visioning":** Documenting and understanding any future business requirements that must be enabled by the ERP system. This may have been performed as part of the selection process. If this is the case, the proposed "to be" processes should be compared with the vendor-provided process templates. Typically, this step is supported by a vendor-provided process template that documents how the ERP system best aligns with specific business processes.

- **Initial Package Configuration:** Configuring the package to the business process requirements. It is important to focus on standard processes that represent the majority of business events, and to avoid exception processes until the base configuration is complete. The work plan must enable time to address the exception (or infrequently used) processes, because this is one of the key areas where projects encounter difficulties.

- **Code Table and Master Table Usage Design:** Defining how the ERP data structures will be used to meet the information requirements of the business. This step is a predecessor to the data conversion activities defined in Step 4.
• **Gap Analysis:** Understanding the consequences of functional deficiencies related to process requirements, and determining how to resolve the gaps. Resolution of gaps may result in customization.

• **Solution Validation:** A scripted demonstration to management and key users that shows how the configured application will support business requirements in the future. This demonstration provides a valuable checkpoint in the process, enabling feedback to the team and validating that the team is moving in the right direction.

• **Implementation of the Project Technical Environment:** The creation of the application environment in which the project team will perform its work.

• **Technical Infrastructure Design:** The design of the final-state production environment.

Phase 1 typically lasts three to five months. However, several factors can significantly affect the assumed timing of this phase, including:

• **Core-team training** — Instructor and class availability

• **Current-state process review** — The depth of documentation requirements, the variances between facilities, the availability of process documentation and overall process scope

• **Process visioning** — Availability of an industry-specific process model from the ERP vendor, ability to facilitate consensus on future-state process design, overall process scope, degree of process change required, and degree of centralization or commonality desired

• **Initial package configuration** — Availability of a pre-configured application that is based on the industry-specific process model used in visioning; the overall application scope; and whether multiple configurations are required

• **Code table and master table usage design** — Ability to facilitate consensus on usage

### 5.3 Phase 2: Standard Solution Development

This phase focuses on the finalization and testing of the design from Phase 1, including process exceptions, external-process testing, gap resolution, and the development of customizations, interfaces, "bolt-ons" and conversion programs. This phase also finalizes the rollout and training plans for sites and users. Typical activities include:

• **Package and Process Configuration:** In this activity, the Phase 1 configuration is brought to completion, with all gaps and issues resolved. To facilitate this process, it is helpful to partition these activities into three streams: main processes, exception processes and supplemental processes.

  • **Main processes** typically cover 80 percent of business activities and describe the completion of a process without exceptions.

  • **Exception processes** cover the remaining 20 percent of business activities and are typically derived from the main processes, with specific exception conditions. If a main process is "receiving goods," then related exception processes might include receiving an under-shipment of goods, or receiving a shipment with damaged goods.
• **Supplemental processes** deal with the "care and feeding" of the system, but not necessarily the day-to-day transactions. Supplemental processes cover activities such as master data maintenance, data archiving, security maintenance, period-end activities and batch processing.

• **Integration Testing:** Prior to testing the extension of processes outside the enterprise, it is important to test all internal process requirements so that issues with external connectivity can be isolated to the external relationship. Integration testing encompasses the end-to-end testing of processes in a controlled environment. As process configurations are completed, integrated testing, based on pre-defined test scripts, must be completed. Tests should be performed with a complete set of enterprise-specific data, and expected test outcomes should be documented prior to testing. As process components are completed, link and test them together until the complete process decomposition is recomposed and validated through controlled tests. Testing should cover exception and nonexception conditions. Integration testing should include all interfaces, customizations, bolt-ons and external process connections. Testing should be performed in a controlled test environment.

• **Customization Development:** The development of all custom software needed to fill gaps between available and required functionality (from Step 3).

• **Interface Development:** The development of all interfaces between the new ERP system and persisting legacy applications (internal and external), as well as other components of the application portfolio (from Step 3).

• **Training Documentation and Planning:** This encompasses the development of a training plan and the materials required to fulfill the plan. Training materials for students and instructors must be created, along with a software training environment furnished with a set of training data. Identify the different groups of users that need to be trained. List the type of training anticipated for each group (for example, high-level reporting, inquiry-only or transaction entry), then produce a rough estimate of the training sessions needed for each group and an initial estimate of the number of days per session. Add to this the number of sessions required to address all members in a group and to cover all locations. Tally the results to get a sense of the potential training effort. Ongoing training requirements must be taken into account when creating training materials to address staff turnover and worker re-skilling.

• **Conversion Development and Testing:** In this activity, required conversion programs, from Step 4, are developed and tested. Manual conversion is also started.

• **Technical-Infrastructure Implementation:** The production infrastructure is procured and deployed, and necessary support processes (such as disaster recovery, nightly backup and system administration) are defined. A testing environment must be maintained to enable the testing of patches, changes and so forth before release into the production environment.

Phase 2 typically lasts three to six months for the core/pilot implementation. Factors that can significantly affect the assumed timing of this phase include:

• **Package and process configuration** — Overall process scope, number of instances, number of separate configurations, application scope and the volume of gaps

• **Integration testing** — Overall process scope and the volume of gaps
• **Customization and interface development** — The volume and complexity of gaps, the number and complexity of interfaces, the designers’ ability to clearly articulate requirements, the developers’ ability to accurately translate design requirements into applications, and the developers’ familiarity with the ERP environment development tools

• **Training documentation and planning** — Overall process scope and desired level of documentation, number of different user groups to be trained, and number of sessions required to reach all trainees

• **Conversion development and testing** — Volume of conversion programs, quality of data, number of legacy systems and amount of history, and amount of programmatic vs. manual conversion

### 5.4 Phase 3: Pilot Deployment

This phase focuses on the deployment and stabilization of the configured solution in the pilot environment. Any site-specific requirements that are not included in the standard ERP system are implemented as part of this phase. Typical activities include:

• **Site-specific enhancements** — Design, development and testing of enhancements to the standard solution to address location-specific requirements

• **Acceptance testing** — Final user acceptance testing and sign-off prior to going live

• **Data conversion** — Conversion and validation of production data

• **User training** — The training of the pilot users in the system functionality they need to use to perform their roles

• **Cutover** — Putting the new system into production and retiring the legacy system

• **Post-implementation support** — Tracking and eliminating issues that arise after cutover (this should include a post-implementation audit of the project)

• **Standard solution refinement** — The assessment of post-implementation issues, and the incorporation of changes that resolve these issues into the standard solution prior to subsequent implementations

Phase 3 typically lasts three to four months. Factors that can significantly affect the assumed timing of this phase include:

• **Site-specific enhancements** — The number of site-specific requirements

• **Acceptance testing** — User involvement in Phases 1 and 2

• **Data conversion** — Manual conversion requirements and legacy data quality

• **User training** — The number and availability of users

• **Parallel system execution** — The time required to run systems in parallel and match results (an activity not included in the assumptions of this estimate example)

• **Post-implementation support** — The quality of training, the effectiveness of change management and overall solution quality
• **Standard solution refinement** — The number and complexity of required enhancements

### 5.5 Phase 4: Rollout

This phase focuses on the deployment of the configured solution at individual sites. Changes to address any site-specific requirements that are not supported in the standard solution are implemented as part of this phase.

Phase 4 typically takes three to four months for each site. From a planning perspective, however, this phase can be performed for multiple sites in parallel if adequate resources are available. The activities in Phase 4 are fundamentally the same as those in Phase 3, as are the factors that can affect timing assumptions.

### 5.6 Project Management

Project management activities, as defined in the project charter, must be planned and span the life of the project. All project administration activities should be included, such as status reporting, risk management, budget management, quality assurance and resource evaluation. Included in this section of the plan are overarching activities, such as change management, risk management and project communication.

Project administration time should be allotted for all team members in varying increments. For team members, it should be allotted at two to four hours per week, and, for team leaders, at four to eight hours per week. For project managers, project administration should be allocated full-time.

An overall guideline for the project management effort is 20 percent of the total project. This includes senior management/partner time and project manager and team leader administrative efforts. For larger projects, the percentage can be reduced because the staff-to-manager ratio will be higher.

### 5.7 Organizational Change Management

Organizational change management is often an overlooked area of implementation. An organizational change management program should be put in place from the project's inception to effectively plan and manage the impact of the changes the implementation will have on the business. An overall guideline for the change management effort is between 15 percent and 20 percent of the total project. This includes senior management/partner time, change managers' efforts, and training and communication tasks. For larger projects, public sector projects or projects introducing significant change, this percentage may be considerably higher.

### 6.0 Assess External Connectivity Requirements

Identify the number of external relationships and related processes that will be enabled by the project, and determine the collaborative mechanisms that will be used to support them (such as electronic data interchange, XML, portals or shared processes).

Assign one internal resource for every three collaborative relationships to ensure appropriate communication, training, integration and testing. These resources should be in place from the end of Phase 1 and through the remaining project phases until each collaborative relationship is operational. These resources will work with process team members to represent the external business requirements to the overall project team.
7.0 Estimate Supplemental Staffing

Baseline staffing (defined in Step 2) is often in need of augmentation for specific activities that require more resources than the core team can provide. Common areas for core team supplementation include:

- Custom development
- Data conversion
- User training

7.1 Staffing for Custom Development

Custom development staffing, as defined in Step 3, is not required in full at the start of the project. The technical staff typically ramps up during the course of project Phases 1 and 2 once clear requirements are refined through the design process. This leads to a staffing model that assumes:

- 25 percent of staff required in Phase 1
- 100 percent of staff required in Phases 2 and 3
- 50 percent of staff required in Phase 4

7.2 Supplemental Staffing for Data Conversion

Data conversion activities can parallel package configuration with minimal risk of rework. Data cleansing can occur prior to and during Phase 1. Data mapping can also occur during Phase 1, but must be preceded by initial application configuration and an understanding of how specific tables and fields will be used. Conversion programming (extracts, translations and loads) can begin after mapping is complete.

It is important to note that the estimates for conversion from Step 4 are for programmatic conversion activities. Some conversion activities, however, are better handled manually. The conversion of physical inventory data is an example. Because inventory data within legacy systems is subject to many transactions, it varies over time from the physical reality. The best way to get the ERP system loaded with the correct starting inventory information is to perform a complete physical inventory during the "go-live" weekend, and then manually populate the ERP system with the count results.

This approach to conversion requires resources to not only enter inventory quantities into the system, but also resources familiar with the execution of the physical inventory processes. It also requires scheduling with production managers so that work-in-progress inventories can be drained from the manufacturing floor and significant business disruption can be avoided.

7.3 Staffing for User Training

User training can require more bandwidth than the core team has available. This requirement is a function of three variables:

- The number of sites affected by the project
- The number of users to train
- The training approach used
These training resources will be needed during the end of Phase 2 (for training the trainers) and through Phase 4 (for user training), or until internal training departments are capable of providing the required training at the required times.

8.0 Create a Time-Phased, Resource-Loaded Project Plan

This is the culmination of Steps 1 through 7. The project approach defined in Step 5 is the foundation for the overall timeline. The time frames identified need to be applied to the enterprise’s specific calendar to identify constraints imposed by events, such as holidays and traditionally busy seasons (such as the fiscal year-end). In multinational implementation projects, the unique holiday constraints of each country involved must be considered.

The team staff information should be loaded into the plan. The process teams (Step 2) should be applied first, followed by staffing for point requirements (Step 6) and external connectivity management (Step 5). Project managers must factor specific resource constraints into the project plan. If some team members are not assigned to the project full-time, then project plans must be adjusted to reflect actual availability. Typically, no more than 35 hours of a 40-hour work week should be planned per resource per week to enable travel time, vacation, administration and other unexpected personal situations.

At this point, the time-phased resource profile and high-level project plan are complete.

9.0 Estimate Resource Rates and Apply Them to the Plan

Average consulting rates are between $200 and $250 per hour across a complete project team. Billing rates vary dramatically based on numerous factors, including:

- Geographic location (for example, large cities charge more than secondary markets). Regional factors also affect staffing costs (for example, resources in Europe are more expensive than resources in Asia).
- The consultant’s level in the firm (partner, manager, analyst or staff), which usually equates to tenure or years of experience.
- Competency area (that is, strategy, systems integration, Java development, portals, business intelligence, ERP or industry-specific specialization).
- Role in the project (for example, project manager, technical lead or application staff).
- Specialized rates for specific types of deals (such as those involving a high-profile client, cutting-edge project, joint development effort, long-term master service agreement or first-time-through engagement).
- Size and positioning of the organization.

Internal resource rates should be determined based on known enterprise standards. Apply the hourly rates to the project plan (Step 8), multiply them by the hours that apply to each rate and total the results.

On an annual basis, consulting rates increase and consulting resources are promoted. Rate increases and promotions typically go into effect during the July-to-September time frame. Apply a 5 percent to 10 percent increase to external rates for all project months after the effective date of the rate increase. If the project spans two rate increases, then estimate accordingly.
10.0 Estimate Travel, Contingency and Final Project Costs

Estimate travel expenses as 10 percent to 15 percent of the external integrator costs (calculated in Step 9). Travel expenses for internal resources should be calculated as well. In addition, estimate a contingency of 20 percent of the total cost. Split the contingency into two buckets. The first bucket is used to handle true contingencies. If something was estimated inappropriately, then this bucket can be used to offset that error. The second bucket is for scope changes and is only allocated if the requester has an approved business case for the scope change. It is managed separately from the core project budget to isolate the effect of the scope change on the successful completion of the project.

Finally, as many of the aforementioned factors were presented as a range of time or resources, create the estimated range of costs for the project. Avoid creating an exact, fixed number, because that would imply more-detailed work planning than was actually performed in this exercise.

Be aware that, when a cost range is presented to executives, the low end of the range is often interpreted as the likely (or target) cost, while the top of the range is interpreted as a "not to exceed" figure. It is likely that the final range of costs produced by this process will be higher than anticipated.

On an ongoing basis, project planners should re-evaluate the assumptions made throughout the estimating process and revise them as well as the estimate-to-complete, as necessary.

11.0 Conclusion

Estimating ERP implementation costs and duration is a complex process with many variables. Organizations seeking budgetary information for their ERP implementations should use Gartner's detailed 10-step framework to estimate their project's duration and to create a range of potential implementation costs.

In addition, carry out statements of work, estimates and assumptions in detailed work-planning activities. The outputs of the 10-step process will serve as the foundation for the project plan, because planners can refine these estimates with more-detailed, task-level implementation plans.

Organizations must produce an accurate estimate of — and a detailed work plan for — project costs, duration and resource needs before the implementation process begins. Gartner's 10-step process will produce an estimate of several orders of magnitude that are more accurate than using general "rule of thumb" metrics, so that organizations can properly set expectations for time and cost. Otherwise, you will be at high risk of cost overruns and missed deadlines — if not outright project failure.
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