

## Chapter XII

# Procurement and Outsourcing

*A pessimist sees difficulty in every opportunity; an optimist sees the opportunity in every difficulty.*

(Winston Churchill)

Many IT projects involve the purchasing of goods and/or services, and some IT projects are mostly procurement activities, at least from a cost perspective. Between one quarter and one third of all U.S. software projects involve contractors or subcontractors (Jones, 1994). With the increase in IT outsourcing and of outsourcing offshore, there is an increasing need for very formal procurement management.

## Procurement

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PMI defines *procurement* as the processes required to acquire goods and services from outside the performing organization; it breaks procurement down into the following procurement management processes (PMI, 2000):

- Procurement planning
- Solicitation planning
- Solicitation
- Source selection

- Contract administration
- Contract closeout

The Software Engineering Institute (SEI) addresses software acquisition, and there is a separate capability maturity model for software acquisition (SA-CMM); however, in discussing procurement herein, I will follow the PMI process outline. Project management in a contracted situation is more involved and more difficult:

- The PM must deal with another company's procedures and systems
- Problems (in scope, cost, schedule, quality) are not as visible
- Solutions to problems take longer to implement
- The PM must rely on the accuracy and timeliness of vendor reports
- The PM must have a very good relationship with vendor
- Risks are more and greater, thus sound risk management is vital

Risk management in general was discussed earlier in this book, and subcontracting risks were identified and discussed in that chapter. Outsourcing magnifies procurement risks and other corporate risks and this is discussed separately later in this chapter.

Procurement typically involves contracts, and most contracts are formal agreements that contain the relevant requirements/specifications for the goods and/or services to be exchanged. Contracts are enforceable within courts of the specified jurisdiction and, legally, a contract must:

- Contain an offer to provide something specific by one party
- Contain an acceptance of that offer by the other party
- Specify consideration—payment in the form of money or something else
- Involve parties with “legal capacity” (separate competent legal parties)
- Be for a “legal purpose” (that which is to be provided must not be illegal)

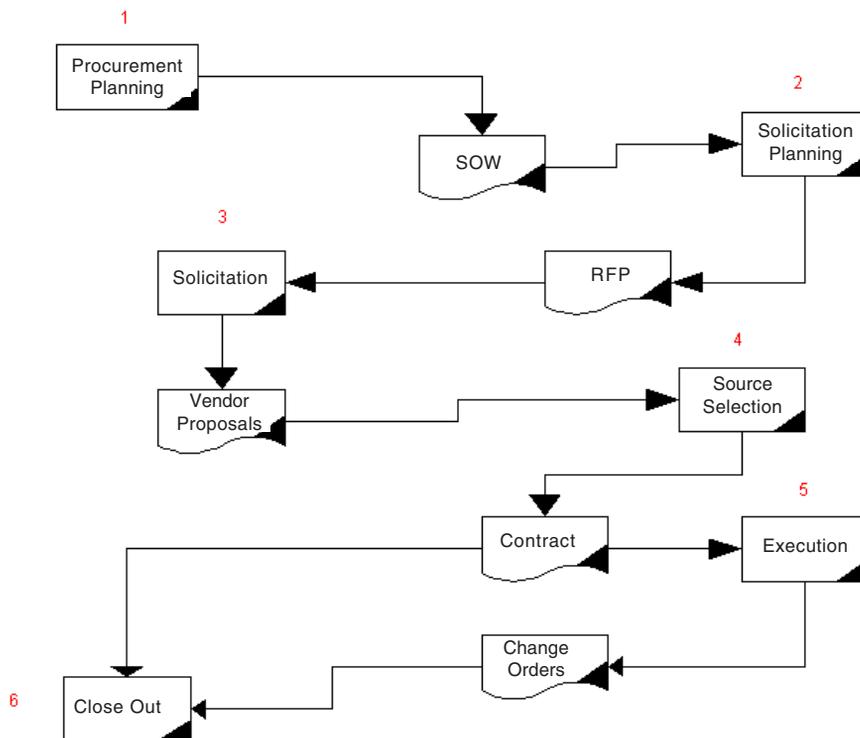
The contract also typically includes business terms and conditions and things referred to in the bid documents, such as marketing literature, specifications, drawings, request for proposal (RFP) information, scope statements, and the like. A contract supercedes any memos or conversations, either before or after the contract is signed. Most IT contracts are atrocious, poorly written, and short on details. The faults lie largely with technology buyers (Hoffman, 2004), so project managers (PMs) need to be fully involved in the procurement process and work with their buyers and/or procurement offices to ensure a successful procurement and contract.

A PM should be named before the procurement process begins. Procurement is actually one form of risk mitigation and the PM should be in control of what is to be procured and how it may affect schedule, cost, quality, and other project issues. Depending upon the

organization, either the PM or a procurement (or contracting) officer may handle the process. In either case, the PM must have an understanding of the needs and risks of the project and communicate these to the procurement officer. Because the PM should be aware of the terms of project contracts, the PM must understand contracts and procurement. An organization may have a centralized procurement office that handles all contracts. The advantages of having such a procurement office are that there is more expertise and experience in contracting, and standardized methods and forms are in place. The disadvantages are that people are not dedicated to the project, and it may take more time to get the officer's attention.

The overall procurement procedure is shown in Figure 12.1. *Procurement planning* involves a make-or-buy decision, and then for the buy decision, creation of a statement of work (SOW). *Solicitation planning* involves the creation of the RFP or other form of procurement document and associated evaluation criteria. *Solicitation* involves the distributing and advertising the RFP and answering questions of potential bidders. *Source selection* involves the selection of a vendor and execution of a contract. *Contract administration* involves the review of reports and correspondence from the vendor, review of the work, approval of payments as required, and the handling changes. *Contract closeout* involves verification that work was completed in a satisfactory

Figure 12.1. Procurement processes



manner, formal acceptance of the work and related deliverables, and gathering and filing all supporting paperwork.

## **Procurement Planning**

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The procurement planning process starts with a description of the needed product and/or services, goes through a make/buy/lease decision process, and then develops a draft statement of work. The make versus buy/lease decision involves which services or products are best bought externally instead of done internally. *Best* is measured in terms of improved risk, cost, time, and quality. It may be better to “make” if one has idle capacity, the need to retain control (i.e., for strategic advantage), or if confidential information is involved. It may be better to buy/lease if the process to produce the product in question is not a core competency of the organization. In considering procurement, one must quantify not only the initial price but the total cost to manage the procurement and any long-term operational or maintenance issues.

Procurements usually involve contracts, and deciding which type of contract to use is part of procurement planning. There are several contract types, although any individual contract may not fall exactly into one of these standard categories. These types have different ways of assigning risk between the buyer and seller (vendor), and also may establish incentives for the seller to complete the contact faster or cheaper. The contract type a buyer uses is usually based upon standards in that industry, the type of goods/services, amount of risk the buyer can tolerate, how well defined the scope is, or amount of change to scope anticipated. The three main types of contract are:

- *FP*: Fixed price (or FFP, Firm Fixed Price)
- *CR*: Cost reimbursable
- *T&M*: Time and material

A key distinction of the contract types involves which party (buyer or seller) bears the risks of cost overruns. In a fixed-price (FP) contract, which is the most common type of contract, one price is agreed upon by the parties and the seller assumes the most risk. A purchase order (PO) is a simple form of a FP contract that is unilateral (signed only by the buyer); the PO is typically used for simple purchases of standard stock items. In a fixed price incentive fee (FPIF) contract, an incentive is added, typically to get the job done quicker or cheaper. An example would be \$100,000 fixed fee, with an incentive of \$5,000 for every week completed before the contract end date. There may also be a sharing ratio (x/y), in which the buyer gets x% of the cost savings (overage) and the seller gets y% of the cost savings. For FP contracts a ceiling cost may be included. Another variation typically used for long-term contracts is the fixed price economic price adjustment (FPECA), which allows for periodic price increases typically tied to material prices or economic indicators.

In a cost reimbursable (CR) contract the buyer assumes the most risk. The vendor’s costs are reimbursed plus some profit; costs typically include all costs, including management and administration (M&A). There are various contract variations that determine the method of calculating vendor profit:

- *CPFF (Cost Plus Fixed Fee)*: The profit (fee) is a fixed amount
- *CPPC (Cost Plus Percentage of Costs)*: There is no incentive for the vendor to control costs (the U.S. government cannot enter into these types of contracts)
- *CPIF (Cost Plus Incentive Fee)*: Buyer pays all costs plus a defined fee, in addition there are incentives to increase (decrease) the fee if costs are minimized and/or schedule is improved; there may be a sharing ratio (x/y), where the buyer gets x% of the cost savings (overage) and the seller gets y% of the cost savings

In a T&M contract, the buyer has some risk, depending upon whether the time or the material cost is greater for the job. The buyer reimburses the vendor for material (either actual cost or a specified rate for each type of material), and the buyer typically pays for time at a specified rate (for each type of worker). The rate for labor includes the seller’s profit. This contract type is typically used for professional services: architects, lawyers, engineers, and programmers. The buyer incurs more risk when the work is done at the vendor’s location because actual work time is harder to oversee. Figure 12.2 illustrates the pros and cons of these contract types.

The statement of work, sometimes called scope of work is written to describe the work to be done under the contract. There are several common forms of SOWs, and the appropriate form depends upon standards in a particular industry, nature of the services/products, and type of contract. Commonly, the SOW legally becomes part of the contract. SOWs typically contain specifications, drawings, plans, requirements, functionality and other descriptions. There are several forms of the SOW:

Figure 12.2. Pros and cons of contract types

	FP	CPFF	T&M
<b>Pros</b>	Lowest risk. Vendor must control costs. Price known. Easier to manage.	Lower cost than FP. SOW may be less detailed.	Simpler SOW. Easy to manage. Good for “professional services” for people at your site under your direction.
<b>Cons</b>	Highest price. SOW must be more detailed. Changes may be expensive. Vendor may compromise quality or scope.	Most risk. Price unknown. Must audit vendor’s costs. More costly to manage. Seller has less incentive to control costs.	Possibly high rates for the people. Difficult to control the amount of time used when the people are not at your location and/or under your direction.

- *Design*: Describes how the product is to be built
- *Performance*: Describes what the resulting product should do
- *Functional*: Defines the purpose of the product and key characteristics

There is normally a relationship between contract type and type of SOW. For an FP contract, the SOW must be very complete and detailed; a design form of SOW usually is used. Often the SOW is done by a design firm, such as an architectural firm. For a CR contract, the SOW is typically not as complete or detailed, and may be a performance or functional SOW. In this case, the buyer realizes there may be considerable additions or changes to the SOW. For T&M work, the SOW is typically brief and could take any of the three forms, but it is more often design or functional. The buyer typically hires bodies for some professional service of a relatively short time period. Figure 12.3 illustrates this relationship.

During procurement planning, and before the draft SOW is completed, there should be a form of Procurement Management Plan completed that clearly states:

- Goods/service to be procured
- Time period desires/constraints (start, milestones, end)
- Contract issues:
  - Type of contract
  - Type of SOW
  - Expected cost (should cost)
  - Other important project-related contract terms (not legal issues)

## Solicitation Planning

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After the procurement management plan and draft SOW is completed, solicitation planning begins. The output from solicitation planning will be bid documents, evaluation

*Figure 12.3. Procurement documents*

Procurement Documents	Form of SOW	Type of Contract
RFP	Performance or Functional	CR
RFQ	Functional or Design	T&M
IFB	Design	FP

criteria, and a final SOW. Bid documents are the papers assembled to describe to vendors the products or services the buyer needs. Bid documents should allow vendors to make suggestions or alternatives that will provide for a better or cheaper procurement and also allow buyers to better compare the vendors. The bid documents usually include:

- SOW
- Buyer identity and corporate information
- Instructions for preparing and delivering proposals
- Vendor evaluation criteria
- Pricing worksheets
- Preliminary contract terms and conditions

There are several forms the bid documents take:

- *Request for Proposal (RFP)*: Request a detailed report on how a job will be done and often who (generically or specifically) will be doing the work
- *Request for Quotation (RFQ)*: Usually used to request a rate for professional services
- *Invitation for Bid (IFB, or RFB)*: Requests one price for total job, perhaps with a breakdown or with rates for specific extras

An RFP usually indicates to a vendor that the buyer is interested in high-quality work, whereas an RFQ or IFB may indicate that the procurement will be mainly price driven. Evaluation criteria are often included in bid documentation, particularly for RFPs, and typically include:

- Financial capacity and history of vendor
- Understanding of SOW
- Contract price and life-cycle costs
- Ability to perform (skill sets of people doing the work) and certifications held
- Management approach including project management
- Vendor suggestions and alternatives

Sometimes a procurement is awarded to a seller without competitive bidding; this may be used when:

- The project is under extreme schedule pressure
- The vendor has unique qualifications

- There is only one vendor for the product or service
- Other mechanisms exist to make sure vendor prices are competitive

*A single-source procurement means that there is a preferred seller, and a sole source procurement means there is only one supplier for this product or service. Whenever a procurement is made without competitive bidding, there may be suspicion of compromise to procurement integrity; one has to be extremely careful in such a situation to completely document the reasons for not going through the full competitive process.*

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## Solicitation

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The next step in the procurement process is to begin the solicitation process. In this process, the bid documents are sent to prospective vendors, and eventually proposals are received from these vendors. Vendors may be selected from a number of sources, including listings of qualified sellers in industry publications. Some of these lists may contain vendors that have been pre-qualified by virtue of some past performance, examination, or certification. SEI CMM, ISO, PMI, and other specific network, database, security, or programming certifications are very relevant in IT procurement.

A bidder's conference is often used, which may involve one or more meetings held with prospective vendors to make sure that they understand the procurement documents. The vendors have the opportunity to answer questions; such questions and answers should be written up and distributed to all vendors (whether attending the conferences or not). These conferences are quite important in complex and/or large procurements to obtain the correct pricing for the scope at hand. After the bidder's conference, there is generally a period of due diligence, where both buyer and seller investigate and validate the information provided by the other party, including financial information about each organization.

In order to gain the attention of more sellers, buyers can advertise their procurement. The U.S. government (and many other government bodies) is required to advertise certain procurements in certain publications. Generally, each industry area has trade journals that have sections devoted to such ads.

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## Source Selection

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The next step in the procurement process is source selection, which involves the review of vendor proposals, the selection of a vendor, and the execution of contracts. First proposals are reviewed for completion and timeliness, and the proposals may be rejected entirely or the vendor asked to resubmit depending upon bid document stipulations. Complete proposals are reviewed in detail and "scored" using the established evaluation

criteria. Screening criteria (minimum standards), vendor past performance, comparison of vendor's proposed cost versus a "should cost" value may be used to shorten the list of vendors receiving a full evaluation and scoring. A short list of vendors may be selected for a detailed presentation, site visit, or other fact finding initiatives. Upon preliminary selection, a letter of intent may be issued; however, this letter is not legally binding.

Once a specific vendor is selected, then negotiation begins on contract price and terms. The objectives at negotiations are to develop and protect a good and honest relationship with the vendor and to agree on a fair price for the product/service with reasonable terms. In negotiations it is important to arrive at a win-win situation; if not, one party may try to get back at the other party for what they lost in the negotiations. Price is usually negotiated first, and a final revised proposal representing a last and best may be offered by the vendor. Typical things discussed in negotiations for IT type contracts are price and incentives, payment schedule, work schedule and milestones, work locations and oversight, security issues, standards, responsibilities and penalties, management methods, technical methodology, reporting requirements, documentation requirements, contract change procedures, testing methods and metrics, and ownership of tangible and intangible products and byproducts.

The next step in this process is the execution of contracts. A PM should be involved as a consultant here, but this step needs to be the responsibility of the procurement office, purchasing department, and legal department. Vendor's responses to RFPs (which become part of the contract) are usually written by the sales people of the vendor and written in such a manner to close the deal; important details are avoided. Hoffman presents a list of things to do in contract negotiation (Hoffman, 2004):

- Align the finalization of contracts with the end of vendor's fiscal quarters.
- Include provisions for acceptance testing for both functionality and performance.
- Make sure that software does not include intellectual property of another vendor.
- Have a source-code escrow clause in the contract.

Risk management was discussed in Chapter VIII, and there are more and greater risks involved in activities that involve procurement. As part of risk management planning, risk identification and contingency plans need to be made for most procurements (Perkins, 2002). These include

- Estimating the probability of failure on the part of the vendor, both performance failure and business failures (going out of business, bankruptcy, acquisition, etc.)
- Assess the impact of potential failures
- Evaluate current treatment of vendor
- Protect yourself contractually
- Protect work continuance
- Regularly monitor the vendor work performance and corporate performance

## **Contract Administration and Closeout**

The administrative portion of procurement involves review of the vendor's reports and work results to ensure compliance with contract provisions in regard to scope, quality, time, and cost. Vendor payments may be tied to one or more of these performance dimensions. Contract exception issues should involve both the PM and the contracting officer. A major portion of contract administration particularly in IT contracts involves coordinating contract changes. A portion of the contract should have specified change procedures. The PM is responsible for his or her company's change control system and the interface with the vendor's change control system. Change management was discussed in Chapter XI.

At the completion of a contract, all of the contract artifacts must be gathered and logically and physically filed (contract, contract changes, contract formal reporting, letters, memos, etc.). This provides a basis for information to settle any disputes (legal or otherwise) that may arise from the contract work. This is similar to project closeout, but with more attention to detail in regard to documentation. Lessons learned (postcontract evaluations) should be held and documented for use in future contract matters. Sometimes there may be procurement audits. These are structured reviews of the entire procurement process. The objective may be to identify successes and failures that can be used in other projects (or in other procurements on this project) or to look for suspected wrongdoing on the part of the PM, procurement staff, or project team members.

## **SEI SA-CMM**

The Software Engineering Institute has a model of software acquisition called the Software Acquisition Capability Maturity Model (SA-CMM). It is a model for benchmarking and improving the software acquisition process. The model has a similar structure to the Capability Maturity Model for Software (SW-CMM) but is tailored to the needs of individuals and groups who are planning and managing software acquisition.

Each maturity level indicates an acquisition process capability and has several key process areas (KPA). Each KPA has goals, common features, and specific activities. The common features are commitment to perform, ability to perform, measurement and analysis, and verification. The KPAs for each level are:

- Level 2: Repeatable (basic project management)
  - Planning
  - Evaluation
  - Contract tracking and oversight
  - Project management
  - Requirements development and management
  - Transition to support

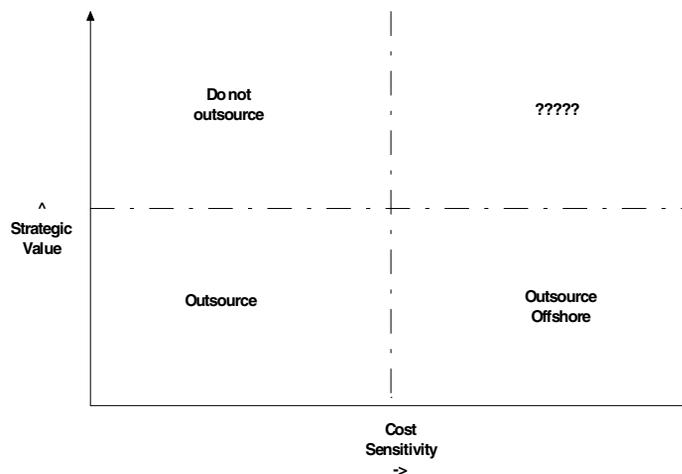
- Level 3: Defined (process standardization)
  - Training program
  - Acquisition risk management
  - Contract performance management
  - Project performance management
  - User Requirements
  - Process definition and maintenance
  - Solicitation
  - Software acquisition planning
- Level 4: Quantitative (quantitative management)
  - Quantitative acquisition management
  - Quantitative process management
- Level 5: Optimizing (continuous process improvement)
  - Acquisition innovation management
  - Continuous process improvement

## Outsourcing

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A trend in recent years has been to outsource some or all of IT resources, activities, or projects. Software development is often totally or partially outsourced to software

Figure 12.4. Outsourcing analysis



subcontractors. There are many factors driving this outsourcing trend, but the major ones are reducing costs by using cheaper labor pools and the fact that highly qualified IT staff are often expensive and difficult to find and retain in the United States and other highly developed countries. Also, by bringing in outside expertise, management can focus less on IT development and operations and more on their key business goals. Outsourcers are specialists, and should understand how to manage IT staff and other resources more effectively. Outsourcers may have larger IT resource pools that can provide greater capacity on demand.

Outsourcing is primarily a major means of cost control that allows an organization to focus on its core competencies. Figure 12.4 shows the traditional decision space for an outsourcing decision. The classic outsourcing model was to outsource only processes that did not give away competitive advantage. Processes that were not strategic but that were cost sensitive (cost of labor is very important) were considered for outsourcing to locales where labor was very cheap.

A new model sometimes outsources competitive advantage functions, if these are completed by outside experts with the proper confidentiality agreements, security safeguards, and legal foundation. *Selective outsourcing* is the decision process that chooses which IT capabilities to retain in-house and which to outsource. *Software Development Magazine* lists the factors that make good outsourcing project candidates (Strigel, 2004):

- Not much innovation required
- Close collaboration not required
- No critical or strategic code
- Limited need for specialized domain knowledge
- Minimal dependencies on other projects
- Stable hardware and software platforms
- Clearly defined requirements, performance goals, and acceptance criteria
- Internal management and domain expertise available to the supplier

*CIO Magazine* also listed the type of work that will likely be outsourced as opposed to the type of work that will not (Koch, 2004):

Going:

Highly defined, noncollaborative programming  
Commodity help desk  
Legacy maintenance

Staying:

Collaborative, creative programming  
Project management  
Requirements analysis

Design

Business process consulting

Processes requiring ultra-high-service levels

Security risk processes

The Software Engineering Institute's (SEI; [www.sei.cmu.edu/cmm](http://www.sei.cmu.edu/cmm)) CMM also considers outside contracting and defines necessary Level 2 practices for software subcontract management:

- Is a documented procedure used for selecting subcontractors?
- Are changes to subcontracts made with the agreement of all affected parties?
- Are regular technical interchanges held with subcontractors?
- Are the results and performance of the subcontractors tracked?
- Does the project follow a written policy for managing subcontractors?
- Are the people responsible for managing subcontractor appropriately trained?
- Are measurements used to determine the status of subcontract management activities?
- Are the subcontract activities reviewed with the PM on a regular basis?

An organization can outsource activities to another company within the same country or outsource to companies in other countries. Outsourcing to other countries is called *offshore outsourcing* or just *offshoring*. *In sourcing* involves using the company's own employees. *Offshore insourcing* involves using employees of that company who live in another country. There are a number of ways companies utilize labor markets to reduce manpower costs, and the following table lists some of the common terms for these options:

<u>Outsource</u>	<u>Insource</u>
On Shore	On Shore
Offshore	Offshore
Near Shore	Near Shore
Best Shore	Best Shore

All of these options involves trade-offs in terms of cost, quality, creativity, risks (organizational, security, economical, political, legal), loyalty, and career-path development. Almost one half of all U.S. CIOs used offshore outsource providers in 2004, and two thirds plan to send work overseas. The Gartner Group predicted that by the end of 2004, 1 in every 10 IT jobs with U.S.-based companies would be staffed offshore. Eighty-six percent of the 100 plus U.S. IT executives surveyed by *CIO Magazine* in 1993 said they already outsourced offshore application development, and 26% offshore their call

Figure 12.5. Programmer salaries

Country	2003	2015
United States	74,486	85,000
Germany	39,879	65,000
England	38,450	67,000
France	37,250	65,000
Japan	30,338	35,000
Russia	7,540	25,000
India	6,350	20,000
China	5,852	10,000
Thailand	1,760	8,000

Figure 12.6. Outsourcing market share

Country	Market %
India	57.8
United States	5.6
Germany	2.8
Australia/Oceania	2.6
United Kingdom	2.3
China	2.1
Mexico	2.0
South America	1.9
Africa	1.4
Other European Countries	13
Other Asian	8.5

centers; all predicted their offshore outsourcing to rise. Gartner further estimated that by 2005, 30% of the top global 2,000 companies would have a sourcing strategy encompassing near-shore or off-shore solutions (Datz, 2004). A quick comparison of programmer salaries and projected salaries around the world (Figure 12.5) explains the push to offshore software projects.

India leads the world in attracting offshore outsourcing IT work, with almost 60% of the total global market; the distribution is shown in Figure 12.6 (Greenspan, 2003).

India is also the largest producer of movies in the world, because movie production is being outsourced from Hollywood to Bollywood in India. India has the second largest English-speaking technical workforce in the world, however India's middle class is estimated at only 0.35% of their total population (approximately 350 million out of 1 billion).

Corporations are always looking for a cheaper source of labor, so India may be close to the peak of their market penetration, especially because salaries are rising quickly in India and the turnover rate is becoming large. Some IT organizations are looking closer to home to minimize travel, communications cost, and, possibly, risks; for U.S. companies, Canada and Mexico, and even cheaper markets in the United States (such as Oklahoma) are being given a second look. Ciber Corporation, based in Colorado, has picked Oklahoma City as its first "made in America" application development center (Frauehheim, 2005).

Figure 12.7. Outsourcing analysis

Country	Assessment	Political Risk	English	Salaries
India	Leader	Moderate	Good	4 – 12K
China	Up and Comer	Low	Poor	4 – 12K
Thailand	Rookie	Low	Poor	4 – 12K
Malaysia	Up and Comer	Low	Fair	4 – 12K
Vietnam	Rookie	Moderate	Poor	Under 4K
Singapore	Up and Comer	Low	Fair	Over 12K
Philippines	Leader	Moderate	Good	4 – 12K
Ireland	Leader	Low	Good	Over 12K
Russia	Up and Comer	Moderate	Poor	4 – 12K
Poland	Up and Comer	Low	Poor	4 – 12K
South Africa	Up and Comer	Moderate	Good	Over 12K
Israel	Leader	Moderate	Good	Over 12K
Brazil	Up and Comer	Moderate	Poor	4 – 12K
Argentina	Rookie	Moderate	Fair	4 – 12K
Canada	Leader	Low	Good	Over 12K
Mexico	Up and Comer	Moderate	Poor	Over 12K

Many organizations today are performing a formal risk analysis (discussed later in this chapter) and trying to diversify their outsourcing locations (not “putting all their eggs in one basket”). *CIO Magazine* recently ranked 24 countries in regard to key outsourcing characteristics (Datz, 2004; see Figure 12.7).

Whether outsourcing on- or offshore, there are many disadvantages and potential problems to consider, such as:

- Possible abdication of control
- High switching costs—hard to get out of an outsourcing arrangement once one is begun
- Lack of internal technological innovation (loss of creativity)
- Loss of local candidates for career path vacancies
- Loss of worker corporate loyalty
- Outsource provider does not have complete visibility into organizational needs and culture
- Possible loss of ownership
- Loss of work results (possibly due to political instability)
- Privacy problems with data
- Security problems

*Potential security problems are enormous in outsourcing and particularly in offshore outsourcing.* Offshore outsourcing services—which, unlike software development, typically require the transfer of personal data—grew to about \$2 billion in 2003. Consider the potential for compromise of vital trade secrets and possibly the ability for an organization to operate at all when a large percentage of an organization’s software code

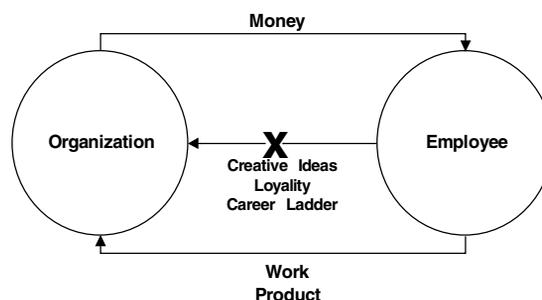
is written offshore. As stated in *Computerworld*, “How do you keep customer data, or the powerful algorithms that give your systems a competitive edge, from being sold to the highest bidder?” (Betts, 2004). *CIO Magazine* listed six steps to making a smart outsourcing decision (Overby, 2004b):

- Resists the instinct to either rule out or not outsourcing based upon initial reactions
- Involve corporate and business units early in the discussion and analysis phase
- Take at least 6 months to study the issues
- Engage outside experts to help study the situation
- Consider the impact on employees
- Once a decision is made, remember that it needs to be revisited as conditions change

*The long-term disadvantages of outsourcing professional work (such as IT programming and design) are only beginning to appear. Programmers often form the foundation for the career ladder to higher level IT jobs because programming develops both essential quantitative analysis skills and understanding of the business process that are the subject of the development. Without that large corporate foundation to select from, where will companies find the competent knowledgeable people to fill vacancies in higher level IT (and other business segment) positions? As stated in CIO Magazine: “As the former deputy CIO of Proctor and Gamble learned, it’s crucial to retain enough work in-house to train the next generation of IT leaders” (Smith, 2004). The business process of compensating professional people for work has always involved more than just code for money; this is illustrated in Figure 12.8.*

For these reasons, many large successful IT organizations do not even consider outsourcing. Such is the case with the retail giant Wal-Mart, whose CIO once stated that “we’d be nuts to outsource” (Sullivan, 2004). About 21% of IT executives surveyed in 2004 by management consulting firm DiamondCluster International said they had prematurely terminated offshore arrangements in the prior 12 months (*Network World*, 2004). *Computerworld* reminded readers of the “mythical man-month” principle, which

Figure 12.8. Employee compensation



says that “you cannot compress the time it takes to complete software by throwing more bodies at it—the brute force programming techniques with low cost coders from India and elsewhere” (Hall, 2004). Research has shown that 80% of organizations have suffered problems ranging from time and cost overruns to nonadherence to specifications and requirements when outsourcing IT projects (Meta Group, 2004). For offshore outsourcing, “while 93% of business technologists surveyed recently by *Software Development* magazine say the work that’s going offshore is either important or critical to their companies’ operations, 56% say what’s coming back is worse than what could be achieved in-house and, in the worst cases, unusable.” (TechWeb, 2004).

Twenty percent of outsourcing deals do not produce cost savings; in fact, 10% of those deals actually wind up increasing costs (Network World, 2004). Claims of 80% savings in cost are exaggerated and do not consider all the cost in offshore outsourcing. A more likely number is 20%, and that takes years of effort and a huge up-front investment (Overby, 2003). *CIO Magazine* developed methods to calculate the total cost of offshoring (TCO), which included cost items and factors (of base contract value) for best and worst case historical data. This is shown in Figure 12.9 (Overby, 2003). As is shown in Figure 12.9, hidden costs range from about 15% to 60%

*Software Development* magazine lists seven steps that help make outsourcing projects work (Strigel, 2004):

- Choose the right partner
- Choose the right type of project
- Choose the right phase of the project
- Manage communication
- Write detailed specifications
- Manage changes
- Manage the project

In terms of partner selection, some suggestions on how to avoid vendor pitfalls in outsourcing include the following:

Figure 12.9. Hidden outsourcing costs

Cost Item	Best Case	Worst Case
Vendor Selection	.002	.02
Transitioning Work	.02	.03
Layoffs and retention	.03	.05
Lost Productivity/ Cultural Issues	.03	.27
Improving Development Process	.01	.10
Managing Contract	.06	.10
Total Hidden Costs	.152	.57

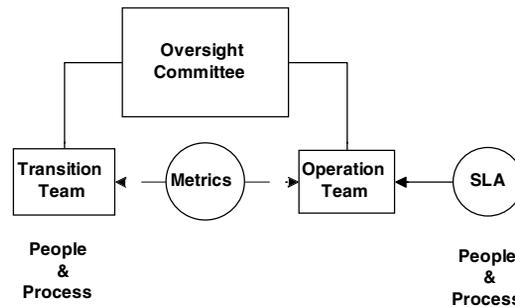
- Do not focus solely on price—vendor markup is about 30%
- Thoroughly evaluate outsourcers' capabilities and certifications (i.e., SEI CMM)
- Work to establish “strategic alliances”
- Use multiple, best-of-breed suppliers
- Choose an outsourcer whose capabilities complement your own
- Base choice on corporate cultural fit as well as expertise
- Develop skills in contract management and procurement

An item on the list concerns the certifications of the vendor, and verifying technical and business competencies is important. However, just as important, and missing from this list, is a comprehensive security assessment of both the outsourcing organization and each and every person that will be involved with the work. Security clearances and complete background checks should be in place for anyone doing IT work or having any kind of access to IT resources. Such clearances and checks have become vitally important for both work that is outsourced as well as the use of foreign labor internally, such as via work and/or study visas.

One key indicator of vendor competence is the SEI CMM maturity level discussed earlier in this book. Today, many U.S. government agencies in addition to the DoD require companies that bid on their contracts have a CMM Level 3 or higher. Some corporations that outsource to India in particular require that software developers have a CMM Level 5, the top level (Koch, 2004). However, some outsource vendors lie about their CMM scores, appraisers cheat and are bribed, and there is no organization that verifies CMM maturity claims. Koch listed 12 critical questions to help validate CMM claims (Koch, 2004):

- Who was the appraiser?
- What part of the company was tested?
- How long ago was this done?
- How long did it take the company to move from one level to another?
- Where is your evidence of continuous improvement?
- Who runs the quality group?
- Was the appraiser from inside or outside the organization?
- Where are the reports?
- What types of projects were assessed?
- Did the appraiser consult on the projects being appraised?
- How many project managers who were assessed at Level 5 will be on your project team?
- How does the company train new people to be CMM Level 5?

Figure 12.10. Outsource management



Another list of outsourcing pitfall avoidances is from Gomolski (2002):

- Know your strengths—Outsource your weaknesses, not your strengths
- Do not completely write off IT infrastructure—Own your processes
- Know what you are outsourcing
- During vendor selection, do not shop based on price alone
- Stay engaged with the work and the vendor

Staying engaged with the vendor involves the marriage of people and process from both organizations, both during the transition and during the operation (or maintenance) phases. This is illustrated in Figure 12.10.

*Software Development* magazine listed 12 warning signs that an outsourcing arrangement may be headed for trouble (Wieggers, 2003):

- Schedule status reports are late, incomplete, or do not correlate with observations
- Unqualified staff are being assigned to the project
- The acquiring organization is not actively managing the relationship with the vendor
- Unrequested requirements (gold plating) are being implemented
- Schedule reviews are postponed or do not take place
- Decisions are not made in a timely manner
- Incomplete deliveries are received
- Processes are being bypassed or not working
- Project tracking charts for earned value are missing
- Cost and deviations have no explanations
- Early milestones are missed

Proper legal foundations (confidentiality, nondisclosures, noncompete, hiring restrictions and other agreements with vendors and individuals) are vital in outsourcing. Renegotiation clauses in these contracts are also very important. Gartner reported that 85% of all outsourcing contracts signed since 2001 would be renegotiated within 3 years because the original contracts did not serve the organization's long-term needs (Gartner Group, 2004). "To a CIO, outsourcing contracts may look like another procurement, but they are much riskier" (Melymuka, 2004). "You're writing a contract for a service that is impossible to describe, that will change over time, that will make you dependent on the service provider, and for which termination is not an option." Specific contract problem areas listed by *Computerworld* are unresolved issues, fuzzy scope, tasks missing from scope, exclusivity, damage waivers, decreasing technology costs (being locked into total costs), complex benchmarking, lock-in to provider, ownership of intellectual property, ceding control of people, and ignoring termination issues (Melymuka, 2004). An *Information Week* survey listed the worst situations companies have faced with outsourcing (Gareiss, 2002):

- Takes more management time than expected
- Does not meet performance specifications
- Unexpected add-on costs
- Does not meet savings projections
- Systems cannot change quickly when strategy changes
- Lack of promised knowledge transfer
- Lack of innovation
- Conflicts over intellectual property

Earlier in this book I discussed software engineering and modern methodologies such as free-flow, incremental methods, agile, and extreme programming. These newer methods are difficult to use in an outsourced arrangement (Iverson, 2004). Thus, outsourcing will limit one's choices in methodologies and techniques. Maintaining a project's knowledge base and continuity is more difficult with an outsourcing arrangement, particularly offshore outsourcing. Foreign employee turnover in offshore outsourcing countries is around 30% and growing. *CIO Magazine* offered a list of 10 key steps in dealing specifically with knowledge transfer between a company and its outsourcing foreign partners (Overby, 2004a):

- Start with a pilot
- Include contract provisions for minimal continuous staffing of critical positions
- Create a knowledge transfer "roadmap" with roles and responsibilities
- Require offshore workers to shadow one's own employees during transition
- Map outsourcer's responsibility to the individual role, not to the team level
- Train outsourcer's people into your processes and terminology

- Conduct classes into language and culture issues
- Keep at least 20% of offshore staff on site as liaisons
- Send a home country based manager to the offshore location
- Rotate on shore and offshore staff

In today's business world, offshore outsourcing may appear to be a competitive necessity for many companies. But it is not always the best option. You should weigh a number of factors before you make such a move. Among them are (Iyengar, 2004)

- *Cost*: Take into account the *total* cost of the move. It may save you some money and increase your competitiveness but some costs may not be readily apparent. Do not forget to consider elements such as physical and system infrastructure, telecommunications, and management overhead.
- *Protection of Intellectual Capital*: You should expect greater difficulty in managing the loss of intellectual property (IP) and the retransfer of IP in offshore situations.
- *Understanding of Local Business Requirements and Culture*: Providers often lack executives on site who can interact effectively with your higher level executives.

"In addition to performing due diligence in assessing factors like these, be sure that your internal debate takes into account the concerns of all your key stakeholders. Offshore outsourcing can be profitable but only if you develop a sourcing strategy that weighs and then diminishes risks" (Iyengar, 2004). For those in IT concerned with functions of their department being outsourced, *CIO Magazine* listed eight steps to take to "outsourceproof" your IT organization (Koch, 2004):

- Focus on collaboration with the business organization
- Compete on process (such as the SEI CMM)
- Develop a standard enterprise architecture
- Sell service levels
- Reeducate your staff (both state of the art tech skills and collaboration)
- Create career paths from tech ranks into collaborative and project management areas
- Augment, don't replace (use outsourcing for overload situations)
- Get transparent (clearly show cost and time)

Deciding what activities to outsource and where and how to outsource them is an exercise in risk management and portfolio optimization. "In an outsourcing relationship, only enterprises that can effectively manage risk will be able to address the issues that will inevitably arise and prevent a successful outcome" (Murphy, 2003). Gartner listed some risk categories and compares the degree of risk of internal software development versus

Figure 12.11. Internal vs. outsourced risk factors

Risk Category	Internal Development	Outsourced Development
Cost Effectiveness	2	4
Business Value Failure	1	4
Operational Failure	4	2
Slow to Operation	5	2
Political Resistance	1	3
Future Flexibility Inhibited	0	4
Management Complexity	5	5

Figure 12.12. Outsourcing analysis by SDLC phase and business process

SDLC	Business Process				
	Finance	HR	CRM	Sales	Manufacturing
Requirements					
Analysis					X
Design					X
Build/Buy	X	X	X		X
Test			X		X
Integrate			X		X
Operate			X		X
Maintain					X

Figure 12.13. Outsourcing risk portfolio analysis

Task	Country 1		...	Country N	
	Cost Factor	Risk Factor		Cost Factor	Risk Factor
1					
2					
3					
4					
5					
6					
...					

outsourced development (Murphy, 2003). This is illustrated in Figure 12.11, where 0 is low risk and 5 is high risk.

Each software development life cycle (SDLC) process can be examined for each business process. The objective is to maximize the cost savings at a tolerable risk. For example, Figure 12.12 shows certain portions (tasks) of different business processes which may be outsourcing candidates.

The choices here may be based upon the magnitude of the cost of each task, the criticality of that task to business continuation, and the potential for security compromises for each area. In a formula it may be represented as:

$$\text{Outsource Potential Cost} = \text{Cost} - \text{EMV}_{\text{business}} - \text{EMV}_{\text{security}}$$

$$\text{EMV}_{\text{business}} = \text{Business Loss} * \text{Frequency}$$

$$\text{EMV}_{\text{security}} = \text{Security Impact} * \text{Frequency}$$

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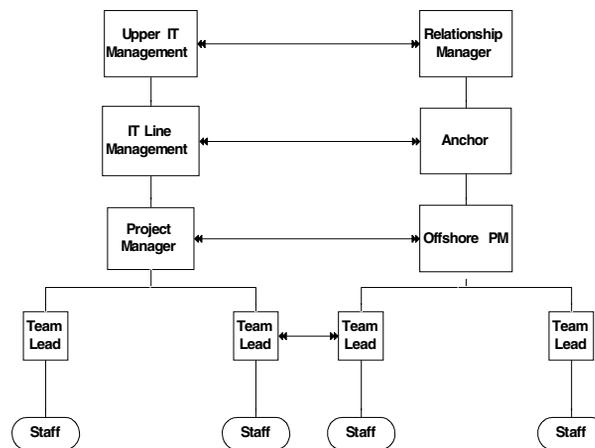
Business losses can occur in a number of ways and some were listed earlier as business value (ROI) not met, operation/implementation delayed, and so forth. Security losses can similarly occur in a number of ways as compromise of customer privacy, compromise of company competitive information, loss of company resources, loss of customer good will, and so forth. Here cost and EMV are measured in dollars per time period. Next one would take each one of these candidate outsourcing tasks and look at the cost and risks of outsourcing each in different locations. This is illustrated in Figure 12.13. Here one wants to maximize the product of cost times risk factor summed over all tasks to be outsourced. The additional constraint is for diversification, and that constraint may specify that no country gets more than so many tasks or so many dollars. The optimization process is similar to maximizing the return and minimizing the risk of a stock portfolio with certain diversity constraints.

As outsourcing matures, mutations of the standard business arrangement are occurring to mitigate some of the inherent problems with offshore outsourcing. One arrangement is being called cosourcing, where work and management is shared between the buyer and the offshore vendor. The five recommendations listed in *MIS Quarterly* for developing successful cosourcing arrangements are as follows (Kaiser & Hawk, 2004):

- Understand where cosourcing is applicable
- Define and develop the appropriate in-house IT competencies
- Build trust but avoid building a binding relationship
- Foster mutual understanding of ethnic and corporate cultures
- Map out a progression to cosourcing

The key to successful cosourcing is the establishment of a dual project management hierarchy. Figure 12.14 shows one successful implementation (Kaiser & Hawk, 2004):

Figure 12.14. Cosourcing implementation



One of the most bitter debates at this point in U.S. history is the extent to which outsourcing is responsible for some of the current labor-market problems. Given the potential impact of outsourcing on the domestic and global economies, this issue has become a “political football.” Responding to a survey on this prominent issue, 66% of U.S. workers believe that offshore outsourcing of jobs is harmful for the economy (Hudson Global Resources, 2004). In the last 3 years, offshore programming jobs have nearly tripled while at the same time U.S. undergraduate computer science majors have dropped by 30% (Chabrow, 2004). India is now graduating 75,000 IT students, compared to 26,000 in the United States. India is the largest recipient of offshore outsourcing jobs, with about IT 50,000 jobs per quarter. About 80% of the jobs coming into India are from the United States. The U.S. Department of Labor has reported U.S. IT job losses at 5,000 per quarter. Thus without offshore outsourcing, there would be considerable IT growth rate in the United States. Other highly developed countries are experiencing the same effect.

The other side to this argument is that offshore outsourcing helps domestic companies save money and thus avert layoffs in other types of jobs. It is difficult to determine a clear, accurate measure of how many total U.S. jobs are being lost to outsourcing, or how many might be lost in the future. Out of the current 140 million jobs in the United States, about 900,000 may have been lost already with up to 6 million lost through this year (2004); another 14 million U.S. jobs are at risk (Center for American Progress, 2004) *Computerworld* predicts that by 2015, 3.3 million white collar jobs will move offshore; of that number, about 500,000 will be IT jobs (Hoffman & Thibodeaux, 2003). Service jobs and IT jobs are at risk in all major developed countries. In the United Kingdom as many as 50,000 jobs moved offshore in 2003; Germany and Sweden are feeling political pressure as well. Up to 25% of IT jobs in developed countries may move offshore by 2010 (Gartner Group, 2004). *America is the only developed nation that does not have protectionist legislation that provides disincentives for companies that use imported and offshore cheap foreign labor.* However, that may change in the future; as of February 2004, 27 bills designed to restrict offshore outsourcing had been introduced into the U.S. Congress. Similar bills have passed or been introduced into legislatures of the individual U.S. states. Both federal and state bills range from full restriction, to preferences for local companies, to limits on work permits and visas (i.e., H-1B and L-1).

Offshore outsourcing has caused a considerable backlash in the United States from both employees and customers. Eighty-four percent of buyers and 82% of providers in the IT sector are now concerned about this negative backlash from their employees (King, 2004). Fifty-eight percent of American workers believe that companies that outsource work that could be done by Americans should be penalized by the U.S. government (ELA, 2004). A Harris Poll stated that 53% of Americans felt it is un-American to send U.S. jobs overseas (St. John, 2004). Twenty-four percent of customers indicated that they will stop doing business with a vendor if they outsource support offshore, regardless of the quality of support (Bodem, 2004). Sixteen U.S. states have introduced “right-to-know” bills that require corporate call-center employees to disclose their geographic location to customers.

Corporate CEOs, however, are certainly benefiting from outsourcing. Studies show that CEO salaries at the 50 U.S. firms outsourcing the most (IBM, Intuit, etc.) increased by 46% in 2003 compared to 365 other large U.S. firms which had an increase of only 9%

(Frauehheim, 2004). From 2001 to 2003, the CEOs of these top 50 outsourcers earned \$2.2 billion while sending an estimated 200,000 U.S. jobs overseas. With outsourcing, the CEO-to-worker wage gap is rising again (after two years of narrowing), with a ratio in 2003 of 301:1.

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## Chapter Summary

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This chapter covered general project procurement and the formal procedures and documents used in procurements, such as the statement of work, request for proposal, and contracts. The different types of procurement documents were discussed along with types used in certain situations and with what types of contracts. In particular for IT projects, the subject of outsourcing was also covered. In the last century, outsourcing was mostly a simple cost-cutting maneuver used for noncritical labor intensive functions. *In the 21<sup>st</sup> century, outsourcing has become a strategic initiative that can drastically transform an organization. In a rapidly changing global IT intensive marketplace, the pressure is on to cut even deeper into one's business for outsourcing opportunities. Take the wrong slice or get it wrong, then undoing the outsourcing arrangement will be a most formidable and expensive task; take the right slices and do it right, and the reward may be very significant. In either case, the security risks and the risk of permanently losing key expertise and creativity for the organization and for an entire country are enormous.*

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