chapter four

# Management Competency

## Management Competency

### 2.0 Management

Per ANSI/NCMA ASD 1-2019 (R2022) (see Annex):

> Successful contract management demands:
>
> - Leadership proficiency through the cumulative effect of competence, character, collaboration, emotional intelligence, and vision;
> - Specialized management skill, acumen, and judgment in such areas as business management, change management, financial management, project management, risk management, and supply chain management; and
> - Continuous, lifelong learning to advance individual competence and organizational capability.

### B. Management

Management competency is important to the performance of contract managers because it consists of the basic functions used to enhance individual competence and organizational capacity while accomplishing the organization's contract management goals.

The value of management knowledge is to become focused on preparing and aligning the workforce and other resources to accomplish team and organizational goals. Reflecting on the leadership competency (see A. Leadership), mastery of the management competency (1) builds *competence* by providing training, education, and experience; (2) builds *character* by developing appropriate practices, policies, and processes; (3) encourages *collaboration* by creating strategies and methods to create teams and ideas that combine to operate smoothly; (4) develops *emotional intelligence* by providing insight to the skills and practices required for individuals to accomplish organizational goals; and (5) executes the organizational *vision* through targeted day-to-day operations.

Successful contract managers demonstrate strong leadership and management competency to motivate their team members to successfully achieve organizational goals. Those who can skillfully perform both competencies in a balanced manner will enjoy a competitive advantage over those who cannot.

Blending leadership (see A. Leadership in Chapter 3) and management competencies fortifies the technical application of contract management (see 1.0 to 4.0). The ability to learn and grow professionally using the management competency will serve to enhance the effectiveness of contract management (see C. Learn in Chapter 9).

**FIGURE 4-1** illustrates how the management competency aligns within the *CMBOK* Competency System.

For contract managers, management is the process of accomplishing contract management by working with and through others. It is the skillful blending of resources such as people, funds, equipment, and time to successfully accomplish a goal. One of the most important elements in an organization's success is the quality of its management.

The four commonly accepted functions associated with management include:

**FIGURE 4-1.** The *CMBOK* Competency System

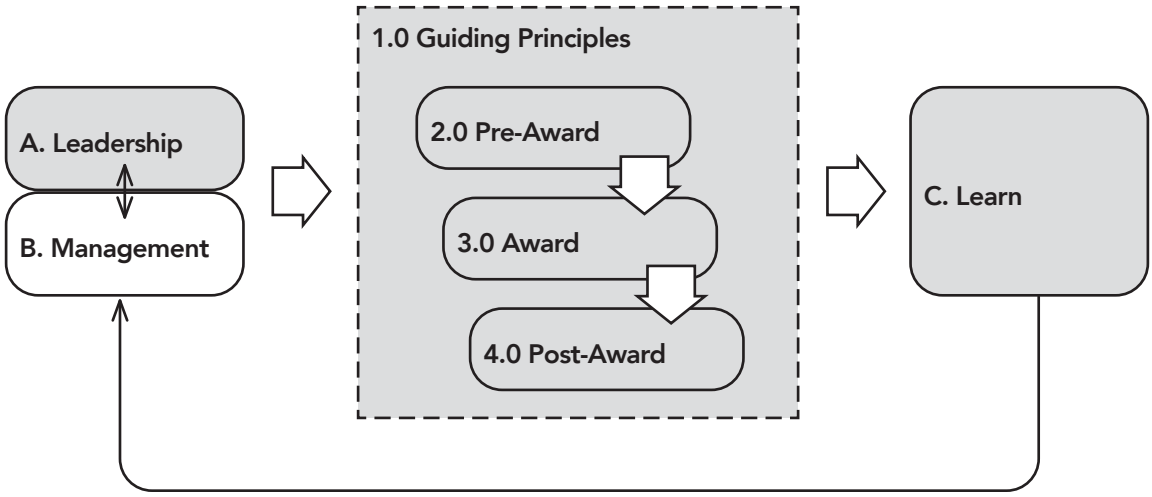


**FIGURE 4-2.** Commonly Accepted Functions of Business Management


B.0.1 Planning
B.0.2 Organizing
B.0.3 Directing
B.0.4 Controlling

**FIGURE 4-2** illustrates their relationship.

***B.0.1 Planning***

*B.0.1 Planning* involves preparing the organization for the future. There are four distinct levels of planning:

- *Strategic planning*—Looks at long-term (e.g., five-year) goals and objectives. A strategic plan is typically based on the organization's mission statement.
- *Tactical planning*—Focuses on short-term (e.g., one- to two-year) goals and involves evaluating economic and environmental issues such as competition (for sellers) and requirements planning (for buyers) to meet the strategic plan's goals.
- *Operational planning*—Looks at the near-term (e.g., from the next few months up to one year) goals and identifies how the organization will meet its tactical goals.
- *Contingency planning*—Involves "what if?" analysis to look at various situations if certain environmental or economic conditions change.

*B.0.2 Organizing* consists of allocating resources to meet goals identified during the planning process. Such resources typically include personnel, financial assets, and the property necessary to meet the organization's mission. Organizing requires managers understand the work that needs to be done, the time it would take to do the work, and how to sort (organize) that effort into tasks or departments and assign personnel to accomplish those specific tasks.

*B.0.3 Directing* is the management of people and processes to accomplish objectives. It is the manager's responsibility to ensure employees are performing their functions in accordance with expectations. Performances and the accomplishments of the team and organizational objectives measure the effectiveness of a manager.

*B.0.4 Controlling* involves monitoring and evaluating how well the team and organizational objectives are pursued and accomplished. Organizational performance measurement and feedback are crucial to making mid-course corrections for contract managers to perform effectively (Kurtz and Boone, 2002).

Organizations use different measurements to evaluate contract management. One survey suggested that contract professionals be evaluated using the following five factors:

- Knowing the rules of the game,
- Exercising sound business judgment,
- Understanding strategy and tactics,
- Knowing the marketplace, and
- Functioning as a team member.

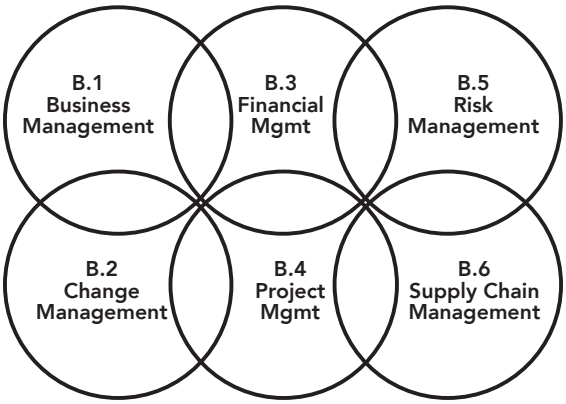
Other contract management metrics might include the measurement of timeliness, responsiveness, and/or customer satisfaction (CMI 2002).

An example of measuring performance may involve contract award and cost/profit considerations for contract managers. Buyers might be measured on the final contract price negotiated within the budget estimate, while sellers might be evaluated on the contract's profitability.

Providing effective customer service can determine the success of contract performance. Measuring customer service typically involves the following five elements:

- *Reliability*—Provide the service consistently and accurately.
- *Responsiveness*—Anticipate and act in a timely manner to meet (and exceed) the customer's needs.
- *Value*—Make the customer feel understood.
- *Empathy*—Let the customer know that you share their concerns.

**FIGURE 4-3.** Management Competencies




- *Competency*—Have technical knowledge of contracting laws and regulations (Newhart 2003).

The contract management staff composition is based on the size of an organization and the complexity of its mission. A small business may have only one person in charge of all contract management activities. A large corporation or government agency, on the other hand, may have hundreds or even thousands of managers, each responsible for some segment of the organization's contract activities. Regardless of the entity's size and purpose, the four key functions of management previously noted are essential.

A successful contract manager is competent in several aspects of management. The following management competencies will be presented as they apply. Each of these competencies are interrelated, and **FIGURE 4-3** illustrates them.

B.1 Business Management,
B.2 Change Management,
B.3 Financial Management,
B.4 Project Management,
B.5 Risk Management, and
B.6 Supply Chain Management.

## B.1 Business Management

In 2000, W. Gregor Macfarlan predicted in his article, "The Buyer as a Business Manager," that "[t]he success of contracting professionals will be measured by their business management skills, not how many contracts are awarded or changes processed." That prediction has come true. Today, a contract manager's job is more strategic and team-oriented, requiring technical competency and acquisition skills to meet customer needs (Macfarlan 2000).

Successful contract managers must understand various aspects of business management. To make sound business decisions, contract managers' skill sets should go beyond knowing the contract's terms and conditions; they must also understand the marketplace in which their organization operates, including accounting, economics, financial analysis, information science/technology, marketing, and operations management. In addition, they must be able to manage and lead a team and understand how to use technology to meet the organization's goals.

Why is competence in business management important to contract managers?

- *Accounting* is important because it is used in estimating costs.
- *Economics* is important because supply and demand will drive the level of competition.
- *Financial analysis* is important because it can determine the financial health of a seller.
- *Information science/technology* is important because information drives decisions and must be handled with confidentiality.
- *Marketing* is important because the product life cycle will influence price and availability.
- *Operations management* is important because it determines lead times and quality.

The following key business management competencies are presented (see **FIGURE 4-4**):

B.1.1 Accounting
B.1.2 Economics
B.1.3 Financial analysis
B.1.4 Information science/technology
B.1.5 Marketing
B.1.6 Operations management

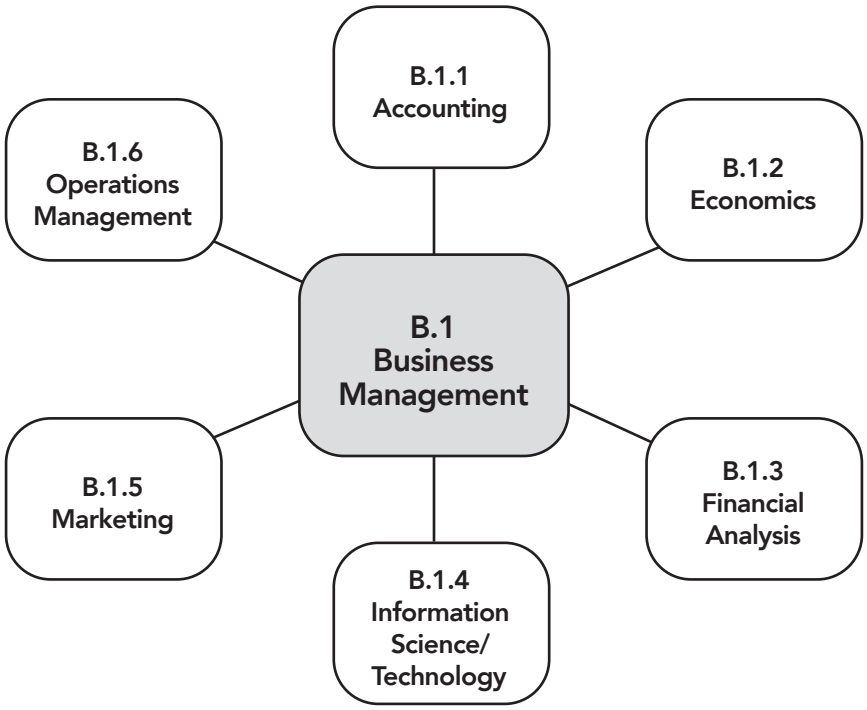
### *B.1.1 Accounting*

Accounting is the way an organization collects, organizes, and records financial information for making management decisions. It is also the way to report a company's transactions and to maintain accountability for its assets and liabilities. The accounting system should be designed to provide reliable data and prevent mistakes that would otherwise occur. Organizations follow established principles to guide their accounting system and avoid mistakes.

#### *B.1.1.1 Accounting Standards*

Generally Accepted Accounting Principles (GAAP)

**FIGURE 4-4**. Business Management Competencies




are general rules used by businesses that are nonregulatory guidance developed and used by certified public accountants (CPAs). They are a set of uniform accounting rules for assigning and measuring costs that are used for recording and reporting financial data to accurately represent an organization's financial condition. GAAP is a body of accounting research, precedents, and standards of financial reporting that has evolved over the years (Acquisition Community Connect 2010).

Federal agencies also have accounting standards to follow. The Federal Accounting Standards Advisory Board (FASAB) is the body designated by the American Institute of Certified Public Accountants as the source of GAAP for federal entities. The FASAB mission is to improve federal financial reporting by issuing federal financial accounting standards and providing guidance.

The *FASAB Handbook of Federal Accounting Standards and Other Pronouncements* explains the accounting concepts and standards for the U.S. government. The standards, interpretations, and technical bulletins in the *FASAB Handbook* are issued in accordance with policies and procedures approved by the Department of the Treasury, the Office of Management and Budget, and the Government Accountability Office (FASAB 2012a).

An organization's accounting system is the primary source for an effective cost estimating system and it should integrate applicable information from a variety of company management systems. Since both buyers and sellers use cost estimates in contract management, contract managers should be familiar with basic cost accounting concepts.

#### *B.1.1.2 Cost Accounting*

(From the *FASAB Handbook of Federal Accounting Standards and Other Pronouncements*)

Cost accounting is the process of collecting, measuring, analyzing, and reporting cost information for internal and external group use. Cost accounting is how an organization uses, accounts for, safeguards, and controls its financial resources to meet its objectives.

Cost accounting produces information for management use that typically uses budgetary and financial accounting data. Cost information is used for many different purposes, such as the following:

- Measuring performance;
- Reducing and controlling cost;
- Determining prices and fees;
- Authorizing, modifying, and stopping programs; and
- Determining production methods.

There are three methods that are primarily used for cost accounting: job-order, process, and activity-based.

#### *B.1.1.2.1 Job-Order Cost System*

Under a job-order cost system, the company accounts for output by identifying specific physical units. The costs for each job or contract are accumulated under separate job orders.

Since the physical units of production under a *job-order cost system* are identified with specific job orders (or contracts), the labor distribution and accumulation method identifies the direct labor cost associated with the units produced. Supporting data in a *job-order cost system* will typically identify the following:

- The labor hours expended to produce the items,
- The employees and their pay rates, and
- The total labor cost with subtotals and breakdowns by types of labor.

#### *B.1.1.2.2 Process Cost System*

Under a process cost system, direct costs are charged to a process for more than one contract that are run through the process at the same time, even though the end items may not be identical. At the end of the accounting period, the costs incurred for that process are assigned to the units completed during the period and to the incomplete units still in process. Process cost systems are used by companies that continuously manufacture a specific end item—like vehicles or chemicals—that requires identical or very similar production processes. A process is just one element of a comprehensive set of activities that an item must complete during its production.

#### *B.1.1.2.3 Activity-Based Costing Systems*

Activity-based costing systems are focused on a production cycle and based on the principles that an output needs activities to produce it and those activities use certain resources. *Activity-based costing systems* assign costs through cost drivers that the activities use to create the outputs. The activity-based costing method uses a two-step process: The first step assigns the resource costs of each activity, and the second step assigns activity costs to the output.

### *B.1.2 Economics*

Economics is concerned with making decisions with scarce resources such as labor, capital, goods, and natural resources. *Economics* influences what gets produced and how much gets produced. Supply and demand are important components in economic production and pricing decisions.

#### *B.1.2.1 Supply and Demand*

(From M. Mandel's book, *Economics: The Basics*)

"Supply" indicates how sellers behave in the marketplace. Supply is represented by an upward-sloping curve that indicates quantity supplied increases as the price increases. Higher prices may increase the quantity supplied because if a business can get more for its products and services, it has an incentive to increase supply. On the other hand, too much supply in a market means there is more quantity than what buyers demand.

"Demand" describes how buyers behave in the marketplace. The quantity a buyer demands is what a buyer is willing to buy at a particular price. Typically, demand is represented with a downward sloping curve that indicates the quantity demanded drops when the price increases. As prices go up, fewer buyers are willing to pay the higher price. Excess demand means there is more demand than the marketplace can supply.

**FIGURE 4-5.** Competition's Impact on Pricing

| Competition | Buyers | Sellers | Market Entry | Pricing Power |
|---|---|---|---|---|
| Perfect | Many independent | Many independent | Relatively easy | Pricing balance between buyers and sellers |
| Monopoly | Many independent | One | Restrictive | Considerable pricing power to seller |
| Oligopoly | Many independent | Few independent | Restrictive | Relatively great pricing advantage to sellers |
| Monopsony | One | Many independent | Relatively easy | Considerable pricing power to buyer |

(Deputy Director of Defense Procurement and Acquisition Policy 2012).

There are four essential laws of supply and demand, assuming that all other factors remain equal:

- If demand increases and supply doesn't change, then the price will increase;
- If demand decreases and the supply doesn't change, then the price will decrease;
- If supply increases and demand doesn't change, then the price will decrease; and
- If supply decreases and demand doesn't change, then the price will increase.

Various factors influence supply and demand, such as technology, interest rates, government regulations, and changes in raw material prices.

Contract managers should also understand how the different types of competition impact the marketplace as well as supply and demand.

#### *B.1.2.2 Types of Competition*

Competition is the central principle of the American economy. When competition does not exist, the forces of supply and demand may not work effectively. The buyer or seller may have an advantage in the pricing decision process.

Different types of competition are used to describe the structure of a market. (See **FIGURE 4-5**.) The market is used to inform buyers and sellers of a particular product or service. The market structure is influenced by how many buyers and sellers exist, the type of products and services involved, and what barriers to entry exist. Barriers to entry include regulatory, procedural, or technological factors that reduce the number of firms that can participate. Technological factors may be barriers to entry for some companies to compete for contracts in certain industries. (*CMBOK* B.1.4 describes how information science/technology is applied in the contract management field.)

##### *B.1.2.2.1 Perfect Competition*

Perfect competition exists when many companies produce identical goods/services and no one company can influence the market. There are no barriers to entry with perfect competition. Perfect completion also includes full knowledge of the marketplace by both buyers and sellers. (Flynn 2013).

##### *B.1.2.2.2 Monopoly*

A monopoly exists when there is only one company in the marketplace and it has no competitors. In a monopoly, the company can reduce output or supply to drive up prices and increase profits. There are typically significant barriers to entry for other companies to consider entering the marketplace (Flynn 2013).

##### *B.1.2.2.3 Oligopoly*

An oligopoly exists when there are only a few companies in an industry with slight differences in products/services. There are some barriers to entry in an oligopoly (Flynn 2013).

##### *B.1.2.2.4 Monopsony*

A monopsony happens when there is only one buyer, such as when only one entity can purchase certain supplies or services. For example, the U.S. federal government is the only buyer for nuclear submarines in the United States (Flynn 2013).

#### *2.1.3 Financial Analysis*

Contract managers use financial analysis to determine if a company is stable enough to receive a contract award. That is why it is important for contracting professionals to have a basic understanding of how finance interrelates to both contract management and business competencies. The tools used to conduct financial analysis are various financial statements that identify how a company gets money, where the money goes, and where it is now.

The three primary financial statements used in financial analysis are (SEC 2013):

- *Balance sheet*—Documents what a company currently owns and what it owes at a specific point in time.
- *Income statement*—Shows how much money a company made or spent over a specific time period.
- *Cash flow statement*—Shows the exchange of money between a company and the outside world over time.

Each of these is discussed in the following sections.

#### *B.1.3.1 Balance Sheet*

A balance sheet provides detailed information about a company's assets, liabilities, and shareholders' equity. A company's assets have to equal, or balance, the sum of its liabilities and shareholders' equity (SEC 2013). (See **FIGURE 4-6**.)

##### *B.1.3.1.1 Assets*

Assets are things that a company owns that have value. This typically means they can either be sold or

**FIGURE 4-6.** Balance Sheet

| Assets (Things owned / used by the business) | | | Liabilities (Amounts Owed) / Funds (Where sourced) | | |
|---|---|---|---|---|---|
| **Fixed Assets (long term in nature)** | | | **Owners Funds** | | |
| | | $ | | | $ |
| **Intangible Assets** | Goodwill | 10,500 | **Issued Common Stock** | | 100,000 |
| | Patents & Licenses | 5,000 | **Capital Reserves** | Revaluation Reserve | 4,353 |
| | | | | Share Premium Account | 5,000 |
| **Tangible Assets** | Land & Buildings | 155,450 | | Foreign Exchange Reserve | 4,720 |
| | Plant and Equipment | 6,850 | | | |
| | Vehicles | 17,500 | **Revenue Reserves** | Retained Earnings | 122,500 |
| | Computer Equipment | 12,200 | | | |
| | | | **Total Owners Funds >>** | | **236,573** |
| | | | | | |
| **Long Term Investments** | Shares in Associated Companies | 1,500 | **Long Term Liabilities (due in more than 1 year)** | | |
| | | | | | |
| | | | Bank Term Loan | | 11,500 |
| **Total Fixed Assets >>** | | **209,000** | Bonds in Issue | | 10,000 |
| | | | Mortgages | | 65,000 |
| **Current Assets (short term in nature)** | | | | | |
| | | | **Total Long Term Liabilities >>** | | **86,500** |
| | | | | | |
| Inventories (stocks) | Raw Materials | 12,000 | **Current Liabilities (due in less than 1 year)** | | |
| | Work In Progress | 48,000 | | | |
| | Finished Goods | 59,543 | Accounts Payable (creditors) | | 48,950 |
| **Total Inventories (stocks) >>** | | **119,543** | Short Term Loans - Bank Overdraft | | 4,000 |
| | | | Taxation and Social Security | | 9,500 |
| Accounts Receivable (debtors) | | 58,450 | Dividends Due | | 2,000 |
| Cash (includes bank accounts) | | 1,028 | Accruals | | 1,998 |
| Prepayments / Deposits | | 1,500 | | | |
| | | | | | |
| **Total Current Assets >>** | | **180,521** | **Total Current Liabilities >>** | | **66,448** |
| | | | | | |
| **Total Net Assets >>** | | **389,521** | **Total Net Liabilities / Owners Funds >>** | | **389,521** |

used by the company to make products or provide services that can be sold. Assets include physical property, such as buildings, equipment, and inventory. It also includes things that can't be physically touched, but still have value, such as trademarks and patents. Finally, cash itself is also an asset. A company's assets are calculated using this formula: *assets = liabilities + shareholders' equity* (SEC 2013).

#### *B.1.3.1.2 Liabilities*

Liabilities are amounts of money that a company owes to others. This can include different kinds of obligations such as money borrowed from a bank to launch a new product, rent to use a building, money owed to suppliers for materials, payroll a company owes to its employees, environmental cleanup costs, or taxes owed to the government (SEC 2013).

#### *B.1.3.1.3 Shareholders' Equity*

Shareholders' equity is sometimes called "capital" or "net worth." It is the money that would be left if a company sold all its assets and paid off all its liabilities. This leftover money belongs to the shareholders (i.e., the owners) of the company. Shareholders' equity is typically expressed in this formula: *shareholders' equity = total assets – total liabilities* (SEC 2013).

### *B.1.3.2 Income Statements*

(From the Securities and Exchange Commission's article, "Beginner's Guide to Financial Statements.")

An income statement is a report that shows how much revenue a company earned over a specific time period. An income statement also shows the costs and expenses associated with earning that revenue. The literal "bottom line" of the statement usually shows the company's net earnings or losses. This identifies how much the company earned or lost over the period.

To understand income statements, start at the top with the total revenue made during the accounting period. The next line is money the company doesn't expect to collect on certain sales, such as returns and discounts. When the returns and discounts are subtracted from the gross revenues, it shows the company's net revenues.

The next major section identifies the costs of goods sold. This part deducts costs or other operating expenses associated with earning the revenue. The subtotal is called "gross profit." The amount is considered "gross" because certain expenses have not been deducted from it yet.

The income statement also identifies expenses. These are operating expenses that a company pays to conduct its business. After deducting the operating expenses from gross profit, the next subtotal is

**FIGURE 4-7.** Income Statement

| Income Statement | | |
|---|---|---|
| **Revenue** | | |
| Income from Sales | $50000 | |
| *Less: Sales Returns* | - $500 | |
| Net Sales | | $49500 |
| Commission Received | | $1000 |
| **Total Income** | | **$50500** |
| **Expenses** | | |
| Purchases | $30000 | |
| *Less: Purchases Returned* | $1000 | |
| Net Purchases | | $29000 |
| Bad Debts | | $1000 |
| Wages | | $8000 |
| Electricity and Other Charges | | $1000 |
| Administrative and Sales Expenses | | $1000 |
| **Total Expenses** | | **$40000** |

called "net operating income."

The last section identifies other income, such as interest. The net income, or "bottom line," is how much the company earned or lost during the accounting period. Some income statements also account for income tax deduction to arrive at the net profit or net loss. **FIGURE 4-7** illustrates an income statement.

To conduct a financial analysis, contract managers must also understand the relationship between assets, liabilities, and shareholders' equity. The first step is understanding the different types of assets.

#### *B.1.3.2.1 Types of Assets*

(From the Deputy Director of Defense Procurement and Acquisition Policy's book, *Contract Pricing Reference Guide, Volume 4*)

Assets can be tangible and intangible and can be classified as current or long-term.

#### *B.1.3.2.1.1 Tangible Assets*

Most assets are tangible because their value comes from their physical substance. Examples include land, buildings, and equipment.

#### *B.1.3.2.1.2 Intangible Assets*

Other assets are intangible because their value comes from a legal claim or additional earning power from a business transaction such as goodwill, patents, trademarks, copyrights, or trade secrets.

#### *B.1.3.2.1.3 Current Assets*

Current assets are assets that can be converted into cash within one year. They include the following:

- *Cash*—Money in the bank or on hand. This term only applies to cash that is readily available to withdraw to meet company liabilities.
- *Marketable securities*—Securities listed for trade through a licensed brokerage firm. They may include U.S. government obligations, state and municipal obligations, corporate securities, and money market instruments.
- *Accounts receivable*—From sales made and billed to customers on credit terms. Only customer accounts receivable from the company's sales can be classified as a current asset.
- *Inventory*—Inventory that is good and salable. For example, manufacturers typically show three different classes of inventory:
    - Raw materials,

- Work-in-process, and
- Finished goods.

#### *B.1.3.2.1.4 Long-Term Assets*

Long-term assets are items that a business cannot easily turn into cash and are not used within one year. They include "fixed assets," which are materials, goods, services, and land used in production. The book value of all fixed assets, except for land, is "depreciated" (reduced) annually to consider the reduction in value over the asset's useful life. Examples include real estate, buildings, plant equipment, tools and machinery, furniture, fixtures, office or store equipment, and transportation equipment.

#### *B.1.3.2.2 Types of Liabilities*

(From the Deputy Director of Defense Procurement and Acquisition Policy's book, *Contract Pricing Reference Guide, Volume 4*)

Most liabilities require paying a specific sum of money to a particular party at a specified time in the future. Some liabilities, however, may be indefinite because the debt may be settled by other than paying money, the creditor may not be known, or the due date may be uncertain. Liabilities may be classified as current or long-term.

#### *B.1.3.2.2.1 Current Liabilities*

Current liabilities are obligations that a business must pay within a year. Generally, they are obligations that are due by a specific date (usually within 30 to 90 days). However, trade practices may permit excluding certain accounts, such as customer's deposits and deferred income, provided the company's records include an appropriate explanation. Current liabilities include the following:

- *Notes payable*—These include notes payable to banks, notes payable to officers or stockholders of affiliated companies, notes payable to the trade, and notes payable to others.
- *Accounts payable*—These are for merchandise or material requirements purchased on credit terms and not paid.
- *Accrued expenses*—These include reserve for taxes; amounts due officers, stockholders, etc.; amounts due affiliated companies; dividends unpaid; and funded current debt.

#### *B.1.3.2.2.2 Long-Term Liabilities*

Long-term liabilities are liabilities that will mature over one year from the balance sheet date. Normally, items in this area are retired in annual installments. Long-term liabilities include the following:Long-term liabilities include the following:

- *Funded debt*—Debts including serial bonds, notes on mortgage installments, mortgages, and other funded debts due after one year. (This is the most common type of long-term debt.)
- *Miscellaneous deferred liabilities*—These include such accounts as reserves for insurance and reserves for contingencies.
- *Deferred credit*—These include such things as unearned income carried as a liability until the related product is completed and delivered.

#### *B.1.3.3 Cash Flow Statements*

(From the Securities and Exchange Commission's article, "Beginner's Guide to Financial Statements.")

Cash flow statements report a company's inflow and outflow of cash. This is important because a company needs to have enough cash on hand to pay its expenses and buy additional assets if needed. A cash flow statement identifies if the company generated cash during its business operations showing changes over time, not absolute dollar amounts at a specific point in time.

The bottom line of a cash flow statement illustrates the net increase or decrease in cash for the stated time period. Cash flow statements are typically divided into three sections:

- *Operating activities*—This section identifies a company's cash flow from net income or losses.
- *Investing activities*—The next section states the cash flow from all investing activities that include purchases or sales of long-term assets.
- *Financing activities*—The last section identifies cash flow from all financing activities. (*Ibid.*)

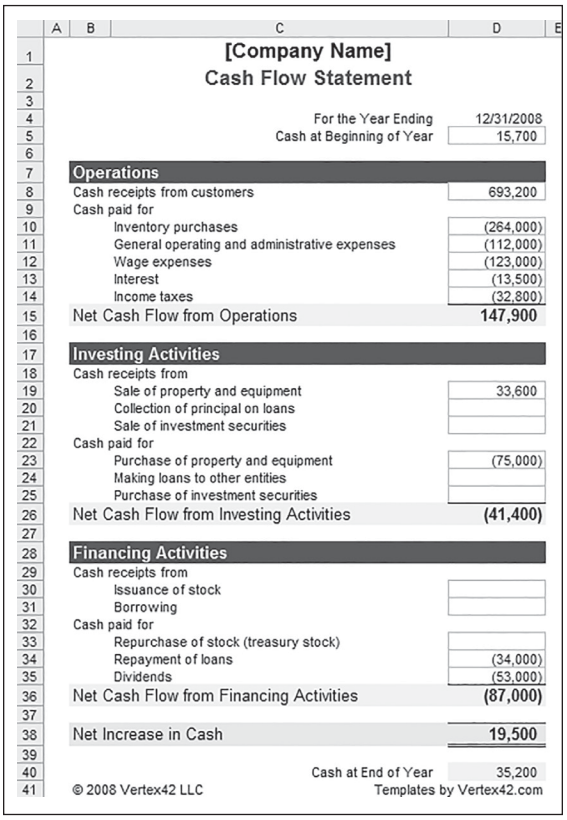
A typical cash flow statement is illustrated in **FIGURE 4-8**.

Now that we have reviewed the tools of financial analysis, we will now discuss how the analysis is conducted.

#### *B.1.3.4 Financial Indicator Ratios*

(From the Deputy Director of Defense Procurement and Acquisition Policy's book, *Contract Pricing Reference Guide, Volume 4*)

**FIGURE 4-8.** Cash Flow Statement



[Company Name]
Cash Flow Statement

| | |
|---|---|
| For the Year Ending | 12/31/2008 |
| Cash at Beginning of Year | 15,700 |
| **Operations** | |
| Cash receipts from customers | 693,200 |
| Cash paid for | |
| Inventory purchases | (264,000) |
| General operating and administrative expenses | (112,000) |
| Wage expenses | (123,000) |
| Interest | (13,500) |
| Income taxes | (32,800) |
| Net Cash Flow from Operations | 147,900 |
| **Investing Activities** | |
| Cash receipts from | |
| Sale of property and equipment | 33,600 |
| Collection of principal on loans | |
| Sale of investment securities | |
| Cash paid for | |
| Purchase of property and equipment | (75,000) |
| Making loans to other entities | |
| Purchase of investment securities | |
| Net Cash Flow from Investing Activities | (41,400) |
| **Financing Activities** | |
| Cash receipts from | |
| Issuance of stock | |
| Borrowing | |
| Cash paid for | |
| Repurchase of stock (treasury stock) | |
| Repayment of loans | (34,000) |
| Dividends | (53,000) |
| Net Cash Flow from Financing Activities | (87,000) |
| Net Increase in Cash | 19,500 |
| Cash at End of Year | 35,200 |

 Templates by Vertex42.com

Most financial analysis involves using ratios. There are different ratios that managers can calculate to support financial analysis. Contract managers should determine which ratios will provide the type of information needed to support the analysis they are conducting. These ratios include the following:

- *Solvency ratio*—Measures the company's ability to meet its current and long-term obligations. *Solvency ratio = (after tax net profit + depreciation)/total liabilities.*
- *Acid test ratio*—Determines how well the company's current liabilities can be satisfied by its current assets less inventory.

  *Acid test ratio = (cash + accounts receivable + short-term investments)/current liabilities.*
- *Current ratio*—The current ratio measures a company's ability to pay short-term obligations or those due within one year.

  *Current ratio = current assets/current liabilities.*
- *Debt to equity ratio*—Measures the relation of debt and owner's equity used to finance the company's operations. This ratio may be expressed either as a decimal or a percentage.

  *Debt to equity ratio = total liabilities/shareholders' equity.*

It can be challenging to compare financial ratios calculated in different time periods because each company's accounting practices may be different and a company may change its accounting practices. For example, material costs may have increased or the company may have changed its inventory accounting, which could decrease the inventory's value without changing the actual units in inventory. This will affect every ratio that includes inventory value. One source of information about accounting system changes is the corporate financial report.

Financial statements represent only one source of financial information about a company and its environment. Other information (e.g., changes in costs or market demand) is not disclosed in financial statements and may have an impact on its financial capabilities. Most financial statements are not adjusted either for changes in market values or in the general price level. This may seriously affect comparability between firms and industry averages.

### *B.1.4 Information Science/Technology*

The field of information science is concerned with collecting, organizing, storing, retrieving, and protecting recorded data. Contract managers frequently use information science tools and technology in their organizations. Many organizations use e-contract, e-procurement, and other online tools to manage suppliers, solicitations, and contracts.

Electronic business uses electronic methods such as e-mail, electronic funds transfer, the Internet, and other media to conduct business transactions. Some of the benefits of electronic business include the following (Russell and Taylor 2009):

- The realization of cost savings from lower transaction costs,
- The shortening of transaction times for ordering and delivering,
- The increase of visibility, and
- Providing more choices and information for customers.

#### *B.1.4.1 Government*

The E-Government Act (*Pub. L.* 107-347) defines "electronic government" (e-government) as the use by the government of the Internet and other information technologies, together with the processes and people needed to implement them, to enhance

the delivery of information and services to the public and others to make improvements in government operations. The basic goals of the act are to use e-government to improve the effectiveness, efficiency, and quality of government service.

The major purposes of the E-Government Act are to promote the use of the Internet and emerging technologies to provide citizens with government information and services, improve decision making by policymakers, and make the government more transparent and accountable. Toward these ends, the act established the Office of Electronic Government within the Office of Management and Budget (OMB) to oversee implementation of its provisions and mandated specific actions for federal agencies to take, such as improving public access to agency information and allowing for electronic access to rulemaking proceedings (GAO 2012).

The System for Award Management (SAM.gov), formerly FedBizOpps, is a web-based portal that allows vendors to review federal business opportunities. Using secured accounts that are password protected, vendors can maintain account profiles in the system. Buyers also use secured accounts that are password protected to establish a buyer profile to create, modify/amend, or cancel an opportunity notice and create an award. Those who are interested in doing business with the federal government can use this system to search opportunities. Opportunities include pre-solicitation notices, solicitation notices, award notices, and sole-source notices. (SAM.gov, 2022)

#### *B.1.4.2 Commercial*

Private industry also uses electronic commerce tools. These tools help buyers find sellers, create purchase orders, and track order fulfillment. They can also establish remote access accounts for sellers electronically. For buyers, the tools can automate project start-ups and create purchase orders so sellers don't have to wait for paper forms. Sellers can submit invoices online and can track payment progress online as well. Buyers can deposit payments directly into the sellers' bank account within hours.

Many businesses offer an online account for individuals, small businesses, and government customers. Online accounts provide easy ordering and payment via credit card. Delivery options from overnight to less costly methods are also available.

#### *B.1.4.3 Contract Management Software*

In addition to the technology used for buying and selling discussed in *CMBOK* 2.1.4.2, many organizations are using automated contract management software to manage solicitations, bids/proposals, and contracts. There are many kinds of contract management software available. Typically, they help an organization automate and manage contracts, agreements, and licenses. These software programs standardize contract writing, including terms and conditions. They can also generate post-award reports to help with change management, cost control, and timely delivery.

The continuing advancements in information technology and communications technology provide significant opportunities for contract managers to be more effective. To provide value to their organization, it is important that all managers become familiar with and have the necessary skills to use the technology available to them.

### *B.1.5 Marketing*

Successful marketing requires timely and relevant information about the marketplace. "Marketplace" can mean different things to buyers and sellers. Buyers consider the sources from which they choose as the marketplace. A seller might have multiple products and services and each one might be considered a separate "line of business" or marketplace.

Many sellers develop a marketing strategy to identify potential customers and retain existing customers. A marketing strategy identifies customers or potential customers a business can serve. Businesses should tailor their marketing strategy as well as the products and services they offer toward the specific customer's needs. To do this, a company would consider prices charged, distribution methods, and promotion avenues. A successful marketing strategy addresses a customer's needs that can be addressed by the seller and allow them to make a profit.

An important element of any marketing strategy is to identify a target market, which is a way to divide or segment the total market to the ones that the company can best serve. For example, there are two ways to segment a market:

- *Geographic*—Specializing in serving the needs of customers in a particular location or area, such as a state or region.
- *Customer*—Identifying the customers most likely to need your product or service and targeting those groups, such as a government agency or prime contractor.

In addition to segmenting the target market, sellers also need to identify the four essential elements of any marketing program (commonly known as the "4 Ps"), which consist of the following:

- *Products/services*—Identifying the right products and services to meet the needs of your target market.
- *Price*—Offering products and services at the right price is important to make your business successful. Understanding the marketplace, such as supply, demand, and competition, will help in determining the right price. (More information about supply and demand is discussed in *CMBOK* B.1.2.)
- *Promotion*—Promotion strategies identify ways to advertise and sell products and services. Many businesses use the Internet to promote their products and/or services. It is one way businesses let their target market know what they offer for sale.
- *Place*—This aspect of the marketing program refers to how businesses get products and services to their target market. If the business sells products, will they have a storefront presence and/or an online presence?

To summarize, marketing involves the following steps (SBA 2017b):

1. Define a target market.
2. Discover what products or services the customers in your target market need.
3. Set a price for the products/services.
4. Advertise the products/services to potential customers.
5. Make the product/services available to customers.

### *B.1.6 Operations Management*

(From Roberta S. Russell and Bernard W. Taylor's book, *Operations Management: Creating Value Along the Supply Chain*)

Operations management is a type of management activity that is mostly concerned with directing and controlling management functions. It includes all activities necessary to manufacture a product or provide a service. Operations management looks for ways to improve the activities or add value to a product or service. Operations management uses customer feedback to improve processes and productivity. The formula for measuring productivity is *productivity = output/input*. Input is usually labor hours used to produce the output. Typical outputs include sales made, products delivered, or customers serviced, and can be measured in either units or dollars. When an organization is more productive, it can expand its ability to provide goods and services.

For example, a customer might say that the procurement department is slow in awarding contracts. Operations management would find a way to improve the procurement department's productivity. Some organizations use "administrative lead time" to measure how long it takes to award a contract. The start date is when a procurement request is received in the contracts/procurement department and ends when the contract is awarded. Improving productivity might involve getting complete procurement requests the first time. Operations management would identify that the requesting department did not always provide accurate information, which would cause the delays in contract awards.

Operations management confirms:

- The organization has the required inputs, such as materials, labor, etc., required to perform the necessary tasks;
- The way inputs become what the organization needs is effective and efficient;
- The outputs are what the organization needs and that they follow to the quality and quantity requested; and
- The management/employees exchange feedback, including ways to:
    - Seek clarification, discuss improvements, and share ideas;
    - Point out mistakes and make improvements;
    - Praise employees for a job well done or for exceeding standards; and
    - Promote continued improvements.

To improve processes and productivity, it is important for managers to understand the organization's core competencies. Core competencies are what the organization does better than others and is typically based on their experience and knowledge. Operations management uses several tools to measure how well an organization meets its core competency, including:

- *Quality control*—Evaluates how the product/service meets the customer's needs.

- *Statistical process control*—Looks at identifying and preventing quality problems.
- *Project management*—typically uses a work breakdown structure (WBS) to organize the work done on a project. A WBS breaks down each task in a hierarchical fashion into components and subcomponents.
- *Supply chain management*—Involves integrating goods, services, and information to meet the customer's needs. A "supply chain" includes all the tasks associated with taking raw materials and transforming them into the final product to deliver to the customer. Supply chain management involves managing the activities to produce and deliver a product or service from suppliers (and their vendors) to the end user customer. Successful supply chain management involves information, communication, and cooperation. Suppliers and customers need to share information about customer requirements, quality, and delivery issues.

## B.2 Change Management

Contract managers experience continual changes to processes, people, resources, milestones, etc. and they must be adaptable to changes and recognize when a contract change is required. Successful contract managers understand and apply change management processes to achieve the vision of organizations, stakeholders, and contracts. (see 4.4)

The following areas are presented in this section:

B.2.1 Change Management Terms and Definitions
B.2.2 Change Management as a Transitional Process
B.2.3 Contract Change Management Process

(B.2.1 and B.2.2 are derived from the *Standard for Change Management®*, First Edition, 2019, Association for Change Management Professionals®)

### *B.2.1 Change Management Terms and Definitions*

**Adoption** – Choosing to accept and demonstrate a new way of thinking or behaving. Adoption occurs when stakeholder behavior is consistent with the future state behavior.

**Benefit** – The quantitative and qualitative, measurable and non-measurable outcomes resulting from a change.

- *Benefit Realization* - The achievement of the expected outcomes of a change.

**Change** – The transition from a current state to a future state.

- *Current State* - The condition at the time the change is initiated.
- *Future State* - The condition at the time when the benefits have been realized.

**Change Impact** – How people, processes, technology, and the workplace are affected during the transition from the current state to the future state.

**Change Management** –- The practice of applying a structured approach to the transition of an organization from a current state to a future state to achieve expected benefits.

**Change Risk** – An event or condition that, if it occurs, may influence the change benefits.

**Change Saturation** - When the amount of change occurring in an organization is more than can be effectively handled by those affected by the change.

**Engagement** – Stakeholder involvement and influence in the change process.

**Governance** – The decision-making processes, applied by authorized individuals or teams, for approving/rejecting, monitoring, and adjusting activities of a change management plan.

**Outcome** – A specific, measurable result or effect of an action or situation.

**Readiness** – The preparedness of an organization or its parts to accept, effectively handle, and integrate impending change.

**Resistance** – A stakeholder's opposition to a change.

- *Resistance Management* - The process of addressing stakeholders' opposition to a change.

**Sponsor** – The individual or group in the organization accountable for the realization of the benefits of a change.

- *Sponsorship* - The process of aligning stakeholders to support and own a change.

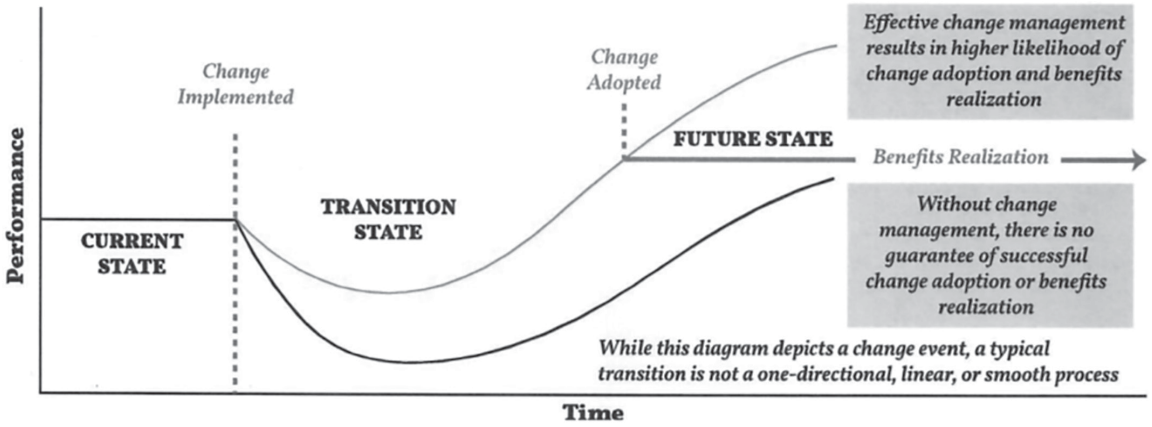
**Stakeholder** – An individual affected by a change.

**Sustainability** – The ability to maintain the future state.

**Vision** – The description of the future state.

### *B.2.2 Change Management as a Transitional*

**FIGURE 4-9.** The Effect of Change Management on the Transitional Process




***Process***

Change is not a single event, but a transitional process with multiple and varied events supporting the objective of moving an organization and its stakeholders from a current state to a future state.

While responding to a change, there is classically a dip in performance due to an individual's normal reaction to change. The disruption can occur at various times throughout the transitional process before the future state is achieved. In some cases, especially without change management, adoption of the change can fail and old behaviors resume. Stakeholders must begin to behave differently for the change to be adopted. **FIGURE 4-9** presents an example of the effect of change management on the transitional process.

To reduce the disruptive effects inherent to change and to increase the likelihood of achieving the future state, change management can:

- *Increase* organization readiness, flexibility, and adaptability;
- *Increase* stakeholder engagement, morale, and preparedness for the new way;
- *Minimize* the depth of any performance and productivity decline during change;
- *Accelerate* and maximize performance during and following the change;
- *Increase* stakeholder utilization of and proficiency in the new way;
- *Minimize* the learning curve and speed to adoption of the new way;
- *Increase* the likelihood of benefits realization; and
- *Optimize* long-term sustainability once the future state is achieved.

***Relationship to Strategic Planning***

Change is initiated at many levels, yet a critical, natural link exists between strategic planning processes and change management. Strategic planning establishes a vision, and its component activities determine the future state and ongoing organizational changes required to successfully operationalize and sustain it. Change management drives individual and collective adoption, thus ensuring achievement of expected benefits and return on investment.

The vision, a leading component of strategic planning, is an aspirational and future-focused statement that typically describes why the change is needed and what the future state will be like and sometimes includes the risks to the organization if the change is not successful.

The vision statement creates the initial and foundational link between strategic planning and change management because it:

- Provides clarity of direction and focus for the organization and stakeholders;
- Identifies high-level results and expected benefits to be achieved;
- Sets the stage for leaders to align stakeholders to a common plan; and
- Acts as a guide for decision making, communications, and engagement.

Successful changes require leaders to articulate a consistent, achievable, inspiring, and easily understood vision that guides the organization to measurable achievement of expected benefits.

***Relationship to Project Management and its Stakeholders***

Project management (see Section B.4 later in this chapter) is the planning, organizing, directing, and controlling of all aspects of a project. If organizational resources are not available to develop and execute the project, then the contract manager is engaged to find a contractual solution.

Project management and change management are complementary yet distinct disciplines that may overlap during change delivery and are often interdependent when delivering value to the organization. The degree of overlap and interdependency can vary between organizations, depending on factors such as organizational structure, type of change, methodologies utilized, competency, and capability maturity.

Effective integration of project management and its stakeholders (see Chapter 1, "Contract Stakeholders") requires change management to ensure that organizational objectives are achieved. Integration can occur across various dimensions, including:

***Roles and Responsibilities***

Project management should focus primarily on the application of skills, tools, and techniques to activities required to deliver planned change (e.g., new systems, new processes, new resources) in a structured way within the required scope, time, cost, and quality parameters. Change management should focus primarily on the application of skills, tools, and techniques to activities required to implement and sustain the delivered change, such as influencing individual behavior and organizational culture, facilitating new ways of working, tracking, and enabling benefits realization, and providing input for future change initiatives. The scope and focus of the two disciplines should be clearly defined early in the planning process. Overlaps and interdependencies should be identified and documented, including how the disciplines will work together, how information will be shared, and how decisions will be made.

***Methodology and Plan***

Project management and change management methodologies differ in focus. Project management methodologies typically emphasize the organization and management of resources and activities required to complete projects (deliver the change) within the defined scope, budget, timeline, and quality standards. Change management methodologies typically emphasize the people side of change and the activities required to prepare the organization for the delivered change, facilitate the transition from the old way of working to the future state, and embed the change as the new norm. The two approaches should be integrated to ensure that the right amount of attention is given to both the technical (delivery) and people (implementation) side of change.

Projects have specific start and end dates but change management activities frequently continue long after the change is delivered and the project is closed. Nevertheless, project management and change management plans should be integrated into an overall plan because project milestones and change management activities may trigger one another.

***Organizational Change and Individual Change***

Change is managed at both the organizational and individual levels. Change management facilitates the transition of organizations and their stakeholders to sustain the future state. Individual behavior change is essential to achieve this objective and the organization's return on investment. It is also important to identify measures of accountability to ensure change is successful at both the organizational and individual levels.

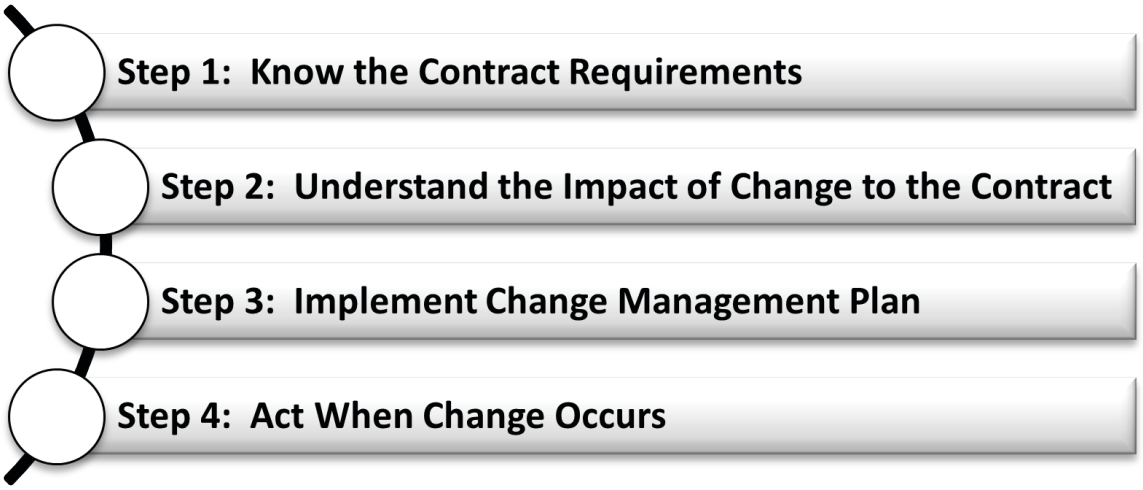
**At an organizational level,** change management efforts assess and understand an organization's:

- Current cultural attributes, which may provide a solid basis for or be an impediment to the change;
- Prioritization of change initiatives in an effort to monitor change fatigue and saturation, as well as build change agility;
- Shared vision and strategic intent for the change;
- New or modified business processes, systems, policies, behaviors, rewards, performance indicators, and procedures needed to successfully work in the future state; and
- Structure and individual roles needed to support and reinforce the change effort.

**At an individual level**, change management efforts address and manage an individual's:

- Unique perspectives, biases, motivations, behaviors, mindset, resistance, and reactions to increase acceptance and commitment in a more productive and resilient way;

**FIGURE 4-10**. Contract Change Management Steps




- Willingness, ability, knowledge, skills, and time capacity necessary to transition to the future state; and
- Sponsorship and active leadership needed to ensure successful change and coach an individual through personal transition.

***Organizational Alignment and Change Management***

Alignment is an important element of successful change initiatives. Leaders must have clarity of purpose and focus to align people, processes, systems, and structures in times of change. They must also develop contingency plans to detect and remediate alignment issues that may occur before, during, or after change occurs. Change capacity and capability can vary greatly from one organization to another, but the likelihood of the successful implementation and adoption of change is increased when the organization's structure, processes, and people are continually aligned to a common vision.

Organizational culture is another important element of organizational alignment that can influence change strategy success; therefore, it is important that leaders create an environment where followers have the necessary time and space to engage in and become comfortable with the new ways of working.

### *B.2.3 Contract Change Management Process*

(Derived from "Managing Change During Contract Performance"; CM Magazine (June 2011); Veronica Cole Harper.)

There are four critical steps applicable to contract administration and oversight that contract managers can apply to execute formal and informal change during contract performance (see **FIGURE 4-10**).

***Step 1: Know the Contract Requirements***

When mired in the heat of performance, a team might act prior to determining what the ground rules and boundaries are. In contract management, the first line of ground rules are the contract terms, conditions, and requirements. These are the items the performing organization is required to demonstrate compliance. Since the people who authored and negotiated the contract may not be the same people charged with performing its requirements, it is incumbent upon the team responsible for contract performance to know and understand what the contract says. Therefore, before the change even begins, understand the contract performance and compliance requirements.

***Step 2: Understand the Impact of Change to the Contract***

Of the four steps, this step is the most crucial, and perhaps the most challenging. Many teams have disagreed whether or not something is a change or whether a suspected change affects cost, schedule, or quality. Is the change administrative? Does it impact the scope of effort? Controlling this aspect of change management becomes even more challenging as team members move on and off the contract. Risk resides in untrained personnel. New team members may not be as quick to recognize a potential change. Inexperienced team members may leap at a chance to address a customer request while not realizing that the request is actually a constructive change. An emphasis on training new

team members on pertinent contract terms, conditions, and requirements, as well as change types can mitigate risks.

***Step 3: Implement Change Management Plan***

The most important point at this step is the derivative benefit of having an archived body of rules applicable to a specific contract (or a body of contracts) for team members to reference when questions arise. There is an enormous benefit to this discipline. Not only is it an excellent contract administration training tool when bringing new members into the performing team, but it is also beneficial in managing customer expectations. Involve the customer throughout the process, but especially and most critically once the plan is finalized and ready for implementation.

The change management plan should capture the basics of the change through "Define," "Incorporate," "Reduce," and "Establish" (DIRE).

- *Define*—Team Roles and Authorities. Begin the change management plan with a simple communication plan. Document who the appropriate customer and program team members are, their contact information, and most importantly, the scope of each person's authority. Identify in specific terms those with the authority to authorize changes, then document who these customer and the performing organization points of contact.
    - Also, incorporate a paragraph specific to how the program and customer personnel will communicate and how often they will meet.
- *Incorporate*—The Plan's Parameters. Provide clear, written direction that formal, written, approval of all changes is required. Identify what contract or grouping of contracts the plan applies to.
- *Reduce*—Applicable Clauses to Process Steps. Step 2 above discussed training team members on pertinent contract terms, conditions, and requirements. Reducing all applicable contract clauses effective in the event of a change to process steps adequately covers addressing the most applicable contract terms (clauses). Applicable clauses to reduce to process steps may include "Notices," "Changes," and/or "Equitable Adjustment" clauses. Other applicable clauses may include "Excusable Delays," "Force Majeure," or "Differing Site Conditions."
    - If applicable, specify the number of days contained in the contract in which the team has to provide formal notification of a change.
- *Establish*—Evaluation and Disposition Processes. Establish a process by which each change will be evaluated and dispositioned. Require the use of a "changes log" to which all changes, regardless of size, will be captured. In the language of the plan addressing the change log, make all team members responsible for change management. Keep the process for advising the team of a potential change simple. In other words, create a process that allows anyone on the team, when faced with a customer request or item with change implications, to bring the item or issue forward for the team to evaluate the cost, schedule, and quality impacts.
    - Require the team to first define the issue. Potential issues could be:
        - » Contract interpretation,
        - » Constructive acceleration,
        - » Defective specification,
        - » Latent/defective government and/or customer-furnished property,
        - » Interference, or
        - » Failure to cooperate.

***Step 4: Act When Change Occurs***

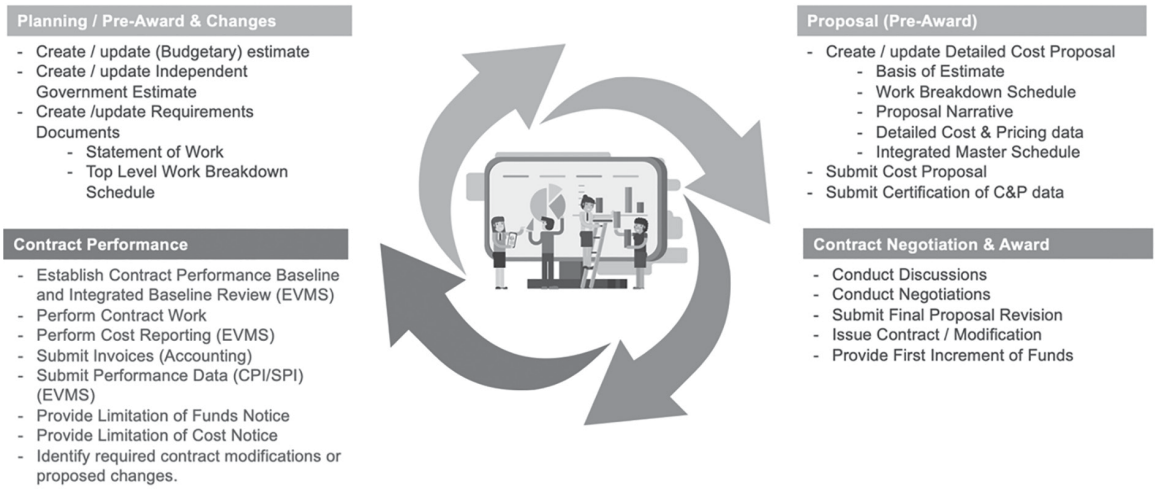
An organization's culture may dictate hesitancy in bringing a change with cost, schedule, or quality implications to the attention of the customer; however, the essence of customer service is managing customer expectations. The customer's expectation is fulfillment of contract requirements. Be disciplined and follow the change management process to manage change as it occurs.

***Section Summary***

Control change by anticipating and planning for change. Train team members to not only know the contract requirements, but to understand the impact of a change to a contract. Implement a change management plan to provide processes and procedures that teams can use to identify, assess, and disposition a change, thereby providing a process framework for acting on changes as they occur.

Communicating the change to relevant stakeholders and having a clear process for change management will likely finalize negotiations in a shorter period

**FIGURE 4-11**. The Contract Finance Life Cycle




of time and lead to quicker implementation of the change.

### B.3. Financial Management

(From Don Shannon's article, "Show Me the Money" – revised by the author)

Managing contract funds is an essential responsibility of the contract manager, and financial management of the contract is equally important to managing the technical detail. Cash is the fuel that powers the contractor's efforts. Converting those funds into labor, materials, and finished goods or services is the function of management; be that contract management, project management, or business management—all of them have a role to play to ensure success.

Contract managers spend a great deal of time with financial issues. Many contract managers spend much more time on financial management than they do on researching FAR provisions and clauses. The function of financial management can vary greatly, depending upon the organization. For example, at a major aerospace company, a program controller may accomplish the tracking and the contract manger simply reports the status. In a smaller company, the contract manager may share the tracking responsibility with the program manager. As a small business owner or program manager, one person may do it all.

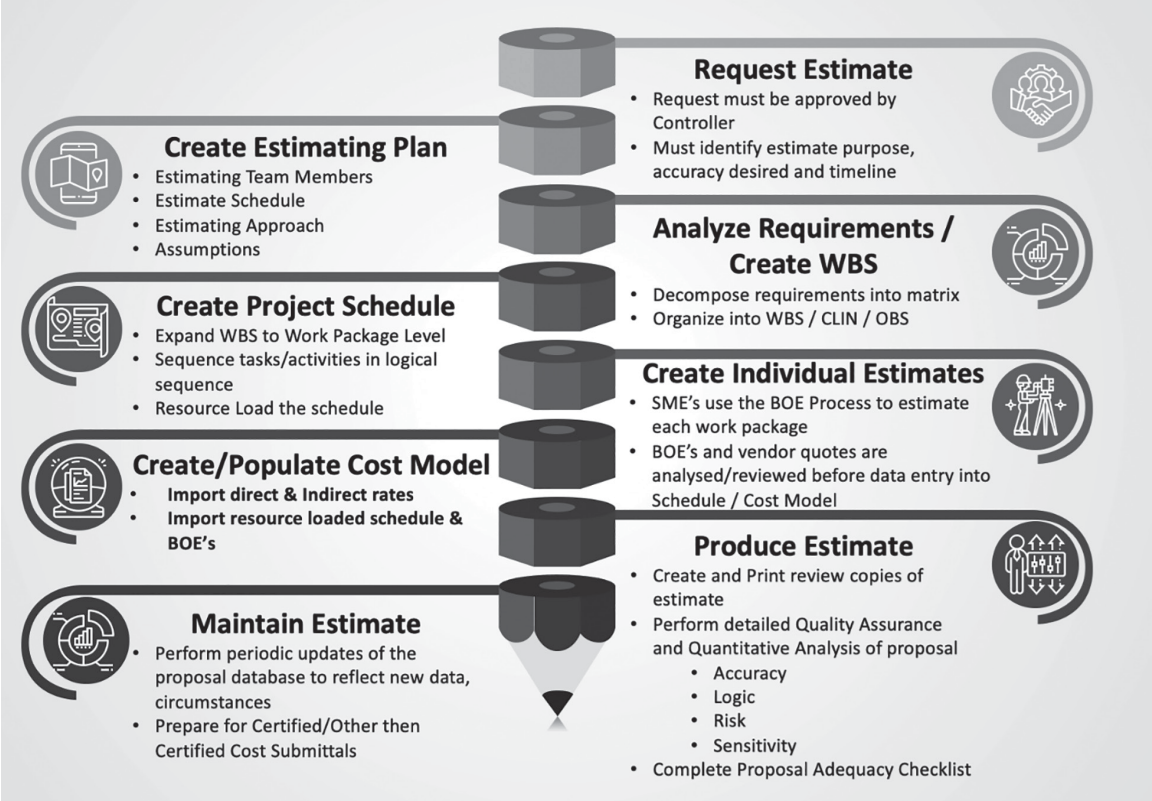
Financial management follows the contract life cycle and consists of several tasks associated with each life cycle phase. (See **FIGURE 4-11**) These tasks may be grouped into two related divisions. The first is estimating, budgeting, and controlling costs which is depicted in the above diagram. The second is ensuring sufficient budgetary authority is available from the buyer to support prompt payment of invoices. The first is common to all contract types. The second is more frequently an issue in incrementally funded contracts.

No matter who does them, certain efforts will always need to be done to keep track of contract funds and ensure the work can continue uninterrupted. These efforts include:

- Establishing appropriate account codes and job numbers;
- Establishing and loading budgets;
- Monitoring contract funding levels;
- Tracking expenditures versus the budget and funding limits;
- Reporting status, including:
  - Periodic (usually monthly) status reports,
  - Limitation of cost status, and
  - Limitation of funds status;
- Requesting additional funds; and
- Issuing "stop work" notices, as appropriate.

While much of this section is devoted to a discussion of how to estimate and then track costs versus a plan, it is important to remember the relationship that cost control has to the success of the business. The basic formula in business is price – cost = profit. So, to the business manager, controlling costs

**FIGURE 4-12.** Financial Management Process




is a method to ensure profits are within expected ranges. Consequently, the better a business is at estimating and controlling costs the more likely it will be able to earn an acceptable rate of return for its owners and investors.

### *B.3.1 Estimating, Budgeting, and Controlling Costs*

The detailed data provided by current accounting software frequently provides the insight needed to effectively manage programs. However, accounting data is retrospective—it tells what has happened with great accuracy, but it does not provide sufficient insight to forecast what will come. Reliance on accounting data alone is akin to trying to drive looking only in the rearview mirror: It works fine if the road ahead is straight, but you will crash should the road curve.

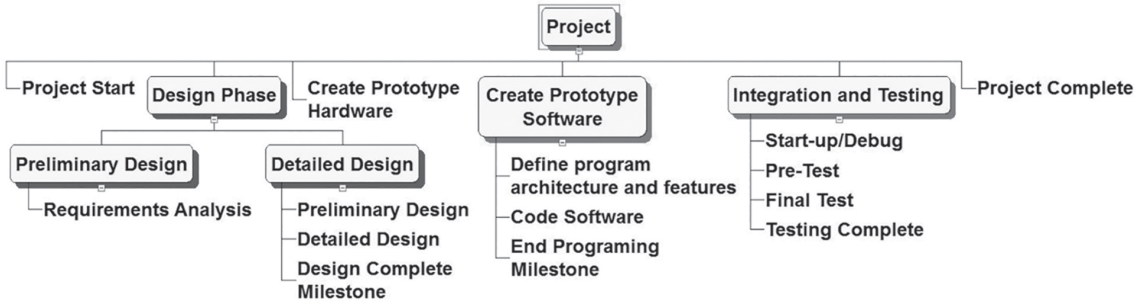
While there are many theories and tools advocated for the project manager or general business manager, the set of tools and information concerning their use for contract managers is somewhat sparse. This section will present an adaptation of some of those tools and techniques the contract manager may find helpful.

One other reminder … much of what is being discussed in this section aligns with and overlaps project management. Many of the documents created (called artifacts by project managers) are multi-purpose documents and are subject to special management control procedures (i.e., configuration management) and will be updated or revised throughout the life of the contract. In that regard there must be close cooperation between the contracts manager, the accounting function, and the project manager to ensure these documents are complete, accurate, and authoritative.

#### *B.3.1.1 Estimating Contract Funding Requirements*

The first step in the financial management process is to develop an estimate of how much funding the contract will require over time—in other words, to map out the road ahead. (See **FIGURE 4-12)** The name for this roadmap is a 'time-phased budget'. The primary source of the estimate is the project manager, whose task (and sometimes the contract manager's if there is no actual project manager) is to translate the work requirements in the contract into dollars and cents. This is normally accomplished by a special team during the proposal phase and

**FIGURE 4-13.** System XYZ Proof of Concept WBS




then reviewed by the contract management team post-award. The review is intended to apportion the estimate created during the proposal effort to performing teams and marry those costs with the schedule to identify when those expenses will occur.

Most mature organizations use a formal estimating process like that illustrated in the below figure. An approved estimating system is one of the business systems required by some government agencies consequently the estimating process is generally regimented as opposed to ad hoc in nature and is performed by individuals with specialized training or skills.

Note that the cost of the project is likely to be estimated several times during the course of the contract. It begins with an estimate created during the pre-proposal time frame that is updated and modified during the proposal process and the negotiations process leading to the "Final Proposal Revision," also known as the "Best and Final Offer." It is also updated to account for contract changes and—in large or complex contracts—re-accomplished when performance varies significantly from the approved baseline (e.g., over target baseline on projects with an "Earned Value" requirement). Additionally, the estimate (or the budget created from it) are periodically reviewed with the primary review coming at or just after contract award.

Regardless of when it is performed estimating follows a defined process. Once the work to create an estimate has requested and approved by a company official the estimating team (generally comprised of a cost-price analyst/estimator, the technical manager and engineers, and the contracting function and supply chain management) starts the actual estimating process using the steps illustrated. Certain of these are explained in the following sections.

It is not uncommon in some contracts to compute an estimate midway through the contract to evaluate the final costs at completion. This is especially true with "Cost Type" contracts when it is necessary to report whether the contractor will be capable of completing the work within the authorized ceiling value of the contract (see Limitation of Cost Reporting below).

### *B.3.2 Create the Work Breakdown Structure (WBS)*

**FIGURE 4-13** shows a WBS diagram for the "System XYZ Proof of Concept." In this example, there are four principal elements of the project (contract), which include:

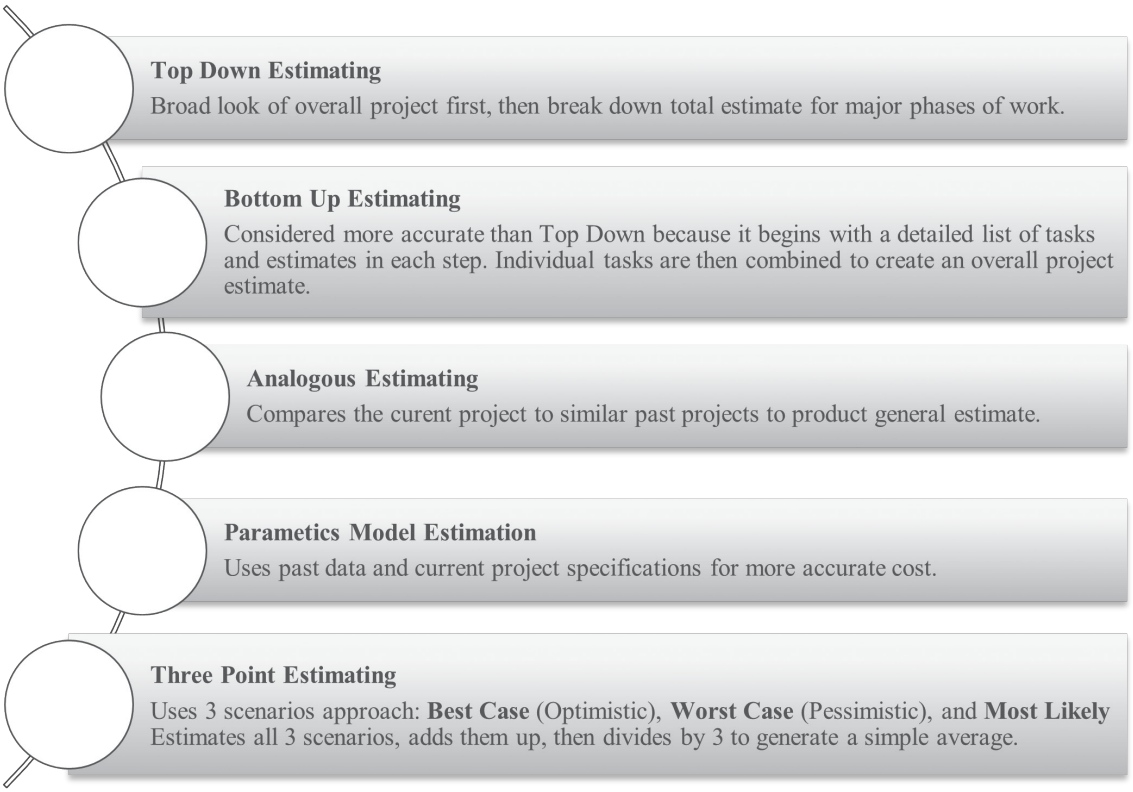
- Project management,
- Product and system engineering,
- Prototype system software and hardware, and
- Integration and testing.

Each of these elements aligns with specific SOW requirements and includes specific contract deliverable items.

The WBS is a product-oriented hierarchical listing of the products or outputs (or alternatively the primary activities) of a project. The WBS is often depicted as a root-and-branch diagram similar to that in **FIGURE 4-13**. The principal rule in play is that all elements sum up to their parent element and represent 100 percent of the cost and effort required to do some unit of work (work package).

During the proposal development process, each of the main elements were identified and subjected to a detailed analysis. Subsequent evaluation further decomposed them into sub-elements using a technique called progressive elaboration. The buyer may include a very top-level WBS to the seller which the buyer expects to be expanded based on the seller's

**FIGURE 4-14**. Types of Estimating for BOE (teamgantt)




approach to performing the work. The seller typically develops (or expands) the WBS to a level whereby any further breakdown would no longer describe outputs (products) but would tend to describe tasks or processes. This lowest level of the WBS is defined as a work package.

### *B.3.3 The Basis of Estimate (BOE)*

The next step in the estimating process is to develop a BOE for each work package. The BOE is a document that identifies data, procedures, and calculations used to estimate resources required to perform a specific task or a group of related tasks. The BOE includes a description of how the work defined in the solicitation will be done, by whom, and how much effort (work) or material is needed to accomplish the task. Various types of BOEs are presented in **FIGURE 4-14**.

BOEs are prepared as a collaborative effort between the technical team (see **FIGURE 4-15**)—who determines the effort and materials required—and the estimating team who develops a compliant cost estimate for each work package.

The BOE is consists of the following elements:

1. A description of the work to be accomplished – best practice is this is an excerpt from or linked to a specific requirement or set of requirements in the solicitation / statement of work. Each BOE should be tracible to the requirements and to the associated WBS element.
2. A (narrative) description of how the requirement will be fulfilled including what, when, and how it will be done.
3. A listing of the resources required in terms of type (labor, material, cost), quantity, rate, and total cost.
4. A rationale describing the method used to estimate the resources and time required to accomplish the work.

A best practice in the BOE process is to allocate the estimated costs by month over the (assumed) project life or to identify a period of performance. BOEs made in this manner may then have the appropriate rates or burdens applied for each year of the contract effort. This is an important consideration for efforts that span multiple accounting years.

**FIGURE 4-15**. Technical and Estimating Team Collaboration (contributed by the JTOA Corporation)

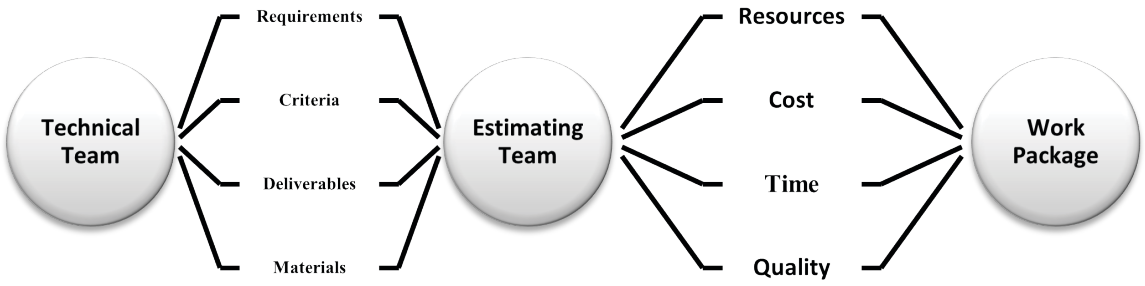
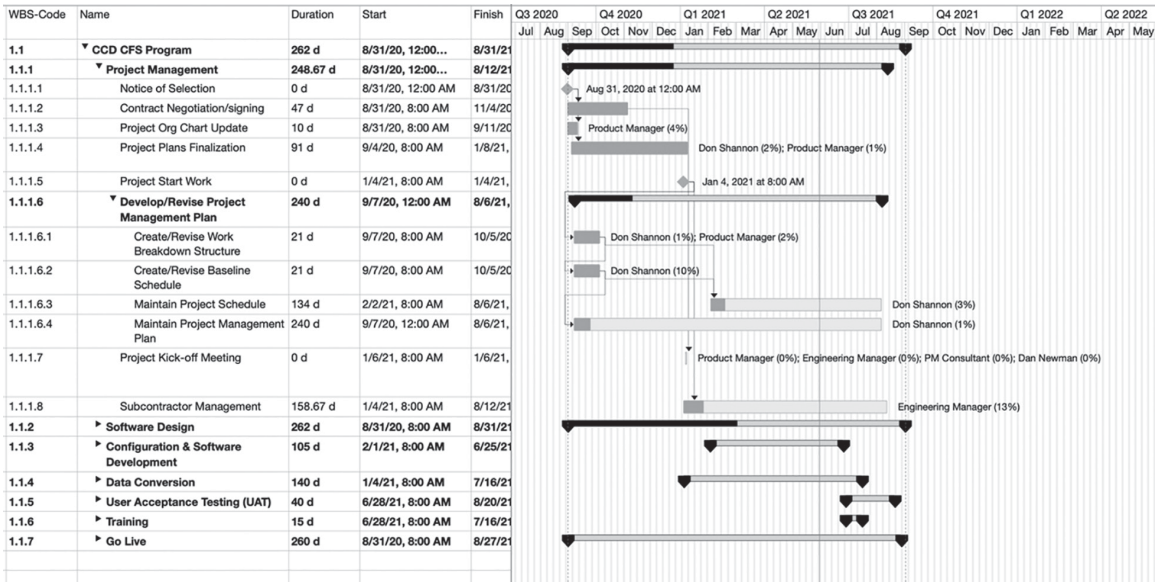



**FIGURE 4-16**. Sample Gantt Chart with Resources




### *B.3.4 The Schedule*

In conjunction with the BOE process (above), the technical team creates a schedule that decomposes the work packages (aligned with the BOEs) and then into supporting tasks. These tasks are then sequenced into a logical order with attention given to predecessor-successor relationships (i.e., tasks that must be complete before others can commence).

Frequently, the solicitation or contract establishes fixed dates for certain events to occur (i.e., milestones). These events are inserted into the schedule and often drive the timing of other scheduled events. They also can impact costs such that if a task must be completed in a time-constrained manner then the seller will likely add resources to ensure meeting the milestone date. This could potentially add cost or risk to the project.

In the next step the technical team assigns resources to each task (as per the BOEs) with respect to labor (hours and specialty), subcontracts, and materials. This then produces a resource-loaded schedule that associates the costs (material and labor) identified in the BOE with the associated work package and timing in the schedule. In doing so, the scheduling software applies rules to allocate resources to the tasks and time-phases the costs in a logical manner producing a document that identifies what will be done, when it will be done, and what resources or costs will be associated with that work.

Schedules are typically shown in a standardized bar chart known as a Gantt chart. The Gantt chart shows WBS elements and their subordinate activities along the vertical axis and time along the horizontal axis. (See **FIGURE 4-16**.)

### *B.3.5 Creating the Contract Budget*

The total estimated cost for performing the contract—be that a fixed-price or cost-reimbursement—is (as stated above) calculated as a part of the "Prepare Offer" activity during pre-award. Therefore, the overall cost is known (or should be known) at the time the contract is awarded. What then follows is the post-award distribution of that value to various entities and the creation of a management document that budgets those costs in relation to who will do the work, what they willdo, what resources they will consume, how much they will spend) and when the work will be accomplished).

In many seller organizations there is a formal project (or contract) kick-off meeting where many of the above details are worked out. The most common approach is for the project manager to distribute funds based on the BOEs and the cost or pricing data used during the proposal. However, some amount of the estimated value is retained by management and held in a management reserve account. This reserve is to guard against added in-scope effort that was not identified or included in the original estimate. The remaining funds are then released to the appropriate managers (departmental or cost account depending on the organization) for project execution.

Most organizations—especially those with a large government contract segment—further divide the lump sum allocations by department or cost center into monthly values to best track the consumption of these resources. The allocation of these funds on a monthly basis is frequently done to mirror the time-phased budget provided by the resource loaded schedule—but not always.

One simple budgeting method—albeit naïve—is to simply "spread" the contract value over time in some sort of level-loading scheme. This technique, called spreading (or peanut buttering) is the lowest common denominator approach. It is easy to implement but fails to consider project phases and ignores the tendency for programs to "ramp-up" or "tail off" in activity at the beginning or end of the project. Thus projections made using this approach may be inaccurate.

Another technique contract managers or project managers rely on is using so-called "burn rates" for budgeting purposes. Burn rates are an average of the estimated costs per month, often based on staffing estimates (i.e., headcount or full-time equivalent workers), and may not vary over time. While this technique is not wrong, it is subject to several variables that can lead to inaccurate projections, not unlike the peanut butter method, and this is especially true should the project ramp up or down, be organized into phases, or include subcontractors or material purchases.

Therefore, a more accurate and preferred approach is to estimate the contract expenses over time based on the resource-loaded project schedule or other planning documents into a time-phased (e.g. monthly or quarterly) estimate. This process is related to (and should use the data collected in) the cost proposal submitted during pre-award. The process is (or should be) that a complete and authoritative estimate is created for the proposal which is then reviewed and updated to reflect any changes made during negotiations to establish a project (baseline) budget.

The steps in the estimate review and budget creation process include:

1. Reviewing the work breakdown structure (see below) for completeness and alignment with the contract requirements.
2. Reviewing and updating the project schedule to adjust for contract award date and negotiated delivery dates if applicable.
3. Working with the accounting department to open account codes (charge numbers) mapped to the WBS and the period of performance/project schedule.
4. Produce a time phased budget typically aligned with the WBS, the Contract CLIN structure, or organization/department.
5. Obtain management approval and authority to 'baseline' and/or distribute the budget to either departments or cost account managers depending on the organization and if they use an earned value management system.

The result of this step is each department or function associated with a project is apportioned (distributed) a given amount per accounting period (or possibly a lump sum) that is then spent by them to do the work.

The term "baseline" was used to describe this budget. Baselining—as used here—infers the budget was reviewed and approved and then "locked down" by requiring any change to it to be conducted

through a formal (and well documented) management process. Such changes can occur for various reasons (see "B.2 Change Management" earlier in this chapter) because of contract modifications or the release of management reserves to address unplanned work.

Ultimately the baseline budget is loaded into the accounting system—usually aligned with the WBS or CLIN structure (or both) and apportioned on a time-phased basis by department or cost center. It thus becomes a management tool that establishes the planned performance in terms of dollars and cents.

This budget information is essential for tracking program performance. A best practice is to establish accounting codes (e.g., charge numbers) aligned with the WBS and then load the associated budgets for each WBS element into the accounting system (see below). This supports tracking variances to the budget across the program and makes it obvious where overruns or problems occur. How far down the WBS "tree" one establishes budget codes is a matter of individual and organizational preference; however, budget codes should be established to the same level of detail as the BOEs that were used in estimating the program costs. This practice will support post-performance analysis of estimate accuracy that will be useful for future projects.

### *B.3.6 Controlling Contract Costs*

Contract costs are reported, collected, and organized in the accounting system of a business. (Note: it is important to distinguish the accounting system comprised of various policies, procedures, and tools from the accounting software). Costs collected through timesheet data, invoices, expense reports, and other data are entered into appropriate accounts and associated with the project, contract, or other cost objective by way of unique account (sometimes called charge) codes.

Government contracts are tracked using project or job cost accounting. This means costs are also organized first by contract then (if needed) according to CLIN or WBS element. Costs are also divided into direct (unique to this project) or indirect (apportioned across several projects) and as allowable or unallowable.

Government contracts have specific prohibitions on charging certain expenses or costs to a contract, such as those listed in FAR Part 31. Companies may incur those expenses (such as first-class airfare, political contributions, entertainment) as in the normal course of doing business but those costs are unallowable for invoicing or other purposes and come out of non-contract funds.

Tracking contract costs begins with the award of a contract. As stated above, accounting codes for the new contract should be created immediately to allow the technical team members (e.g., program managers, engineers) and others to begin charging to them. To accelerate the process of conducting a contract kickoff meeting with the accounting team, project managers should meet with the financial manager with a copy of the WBS, the project schedule (Gantt chart), and cost estimates from their proposals.

During that meeting, it should be identified as to how far down in the WBS it was needed to go when establishing accounting codes. Small projects are typically monitored at a high level. More complex programs require multiple levels of account codes arranged in a hierarchical structure. Additionally, account codes are identified as "Labor" only, "Labor + Materials," or "Labor + Materials + Other Direct Costs," since each accounting category (a.k.a., "buckets") had separate overhead burdens and needed to be segregated accordingly.

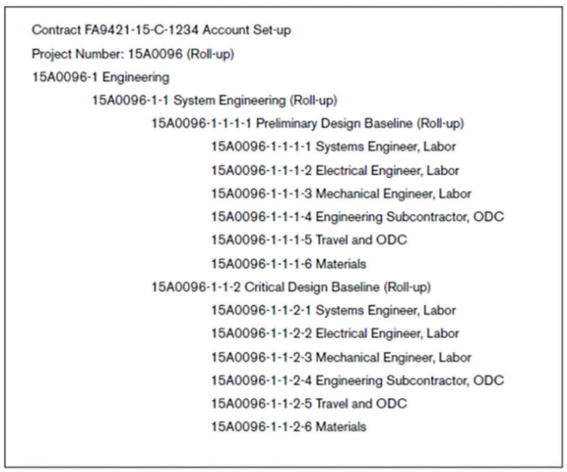
Setting up these accounts is a key function of the program team and is critical to making sense of the accounting data. By and large, the accounting codes should be set up to capture data at the work package level or at the WBS level where performance is to be monitored.

People who are working the program are then issued the appropriate account code(s) for their labor and provided detailed instructions as to what work is to be performed and documented under each code. This information is often transmitted via a work order or during a kickoff meeting. **FIGURE 4-17** depicts what a typical setup might look like. (Note: roll-up accounts do not collect costs but do aggregate costs entered into the lower-level accounts.)

Proper accounting for expenditures is not only essential to tracking the project's performance, but also the law. Mischarging work to the wrong contract is a serious offense, so managers must closely monitor the following:

- The work performed (labor hours),
- Who is performing the work (or charging the account), and
- What miscellaneous charges are being made

**FIGURE 4-17**. Typical Account Code Sample




for travel, materials, etc.

Accounting data is reported on a periodic basis to managers for analysis and control. Part of this process is a review by management to ensure costs (such as timesheet data) is properly recorded in the appropriate account. This also includes a review of labor hours allocated to individuals or teams vs the number of hours reported. Although hours and dollars are related, a good manager examines both.

Financial control is the process of comparing the predicted costs or hours (budget) to the actual values. There are several strategies used by businesses to accomplish this. The lowest-level analysis is called variance analysis and creates a value by subtracting the actual cost from the budgeted amount. The difference (called a variance) is how much under or over budget the department or activity is. Variances can be calculated and reviewed based on several factors such as time (monthly or quarterly reviews) or significance. The presence of a variance simply means the plan and the actual are not in agreement … the more important questions are, "Why is this so?," and, ""Is this of concern?"

Consequently, variance analysis is a better option than simply identifying variances. The analysis seeks to explain why the variance occurred. Common reasons are

1. The budget was level-loaded using a fixed amount each month and the effort is ramping up; thus less was spent than planned.
2. The budget was predicated on using specific resources but they were not available and the substitute resources were more/less experienced or costly.
3. The work was delayed due to other factors.
4. This was the first time a repetitive task was performed and subsequent iterations will be more efficiently performed.
5. Etc.

The important concept behind variance analysis is that the existence of the variance is a flag and the analysis provides a rationale for it. In doing the analysis management or planning deficiencies may be identified and acted upon. Also, variances can be analyzed on a period-by-period basis, which was discussed above, or they can be viewed from an "inception to present" basis where the performance is examined in the context of asking, "How are we doing so far?"

A more advanced control technique is used by many businesses and is sometimes required in government contracts called Earned Value Management (EVM). EVM requires the contractor (and subcontractors in many cases) to implement a formal Earned Value Management System (EVMS) following EIA-748 to address 32 specific guidelines. (See **FIGURE 4-18**)

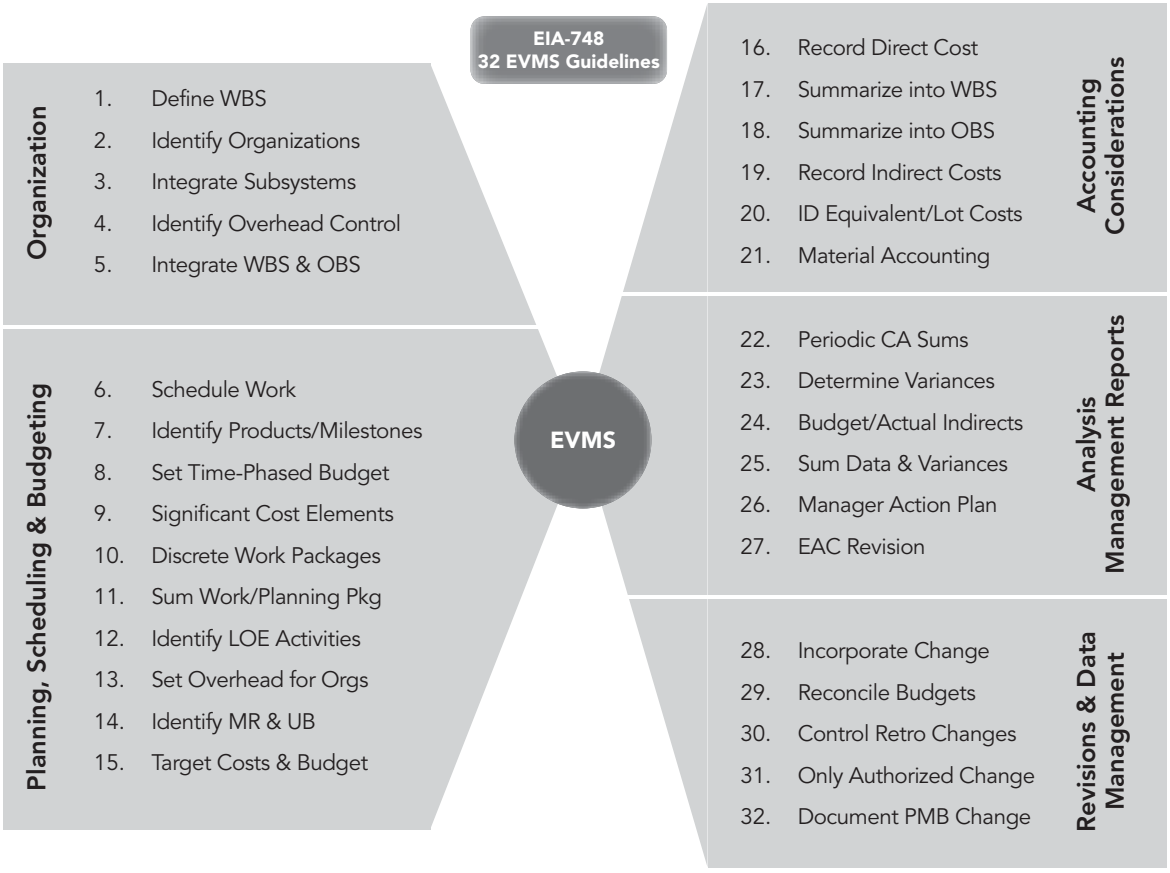
EVMS provides richer and more meaningful financial analysis information and allows managers at all levels to use EVMS-generated metrics to assess performance both in relation to cost and schedule. The key metrics are Cost Performance Index (CPI) and Schedule Performance Index (SPI), which address the actual cost vs. planned cost for specific units of work and the actual time vs. the planned time for the work.

### *B.3.7 Data Currency*

While the account setup example provided in **FIGURE 4-19** provides the necessary infrastructure to collect costs and associate those costs with the work being done, there is a problem that needs to be addressed—latency. Latency is the delay between when a cost is incurred and when that cost appears in the accounting system. Problems arise when comparing performance as of one date and costs collected as of another. This is a common problem with some accounting systems.

Some businesses have implemented semi real-time accounting systems to mitigate the effects of data latency, but these systems typically have a caveat concerning the fact that costs are not final until the accounting department has done an end-of-period

**FIGURE 4-18**. EVMS Guidelines (Image credit to the National Defense Industry Association)




(usually monthly) reconciliation and closing process.

The latency problem is especially noticeable where subcontractor or supplier invoices are concerned. Work accomplished in one month is typically invoiced the following month and may not be paid until the month following that. Consequently, many managers include "accrued" data in their reporting using placeholders for known outstanding expenses. Also, pending expenses may be represented by a "purchase order commitment" or similar entry to identify funds committed to a supplier via a purchase order but not actually paid pending delivery or invoicing. Commitments are an acknowledgment that an obligation exists to a supplier or subcontractor and that some or all of those funds are not recoverable. Consequently, the program cannot spend an amount exceeding actual expenses plus open commitments. Many program managers have tried to spend money (a second time) that was already committed, which leads to budget overruns and program failures. Therefore, when determining when to stop work on an incrementally funded contract, one must consider both the actual spending and the commitments.

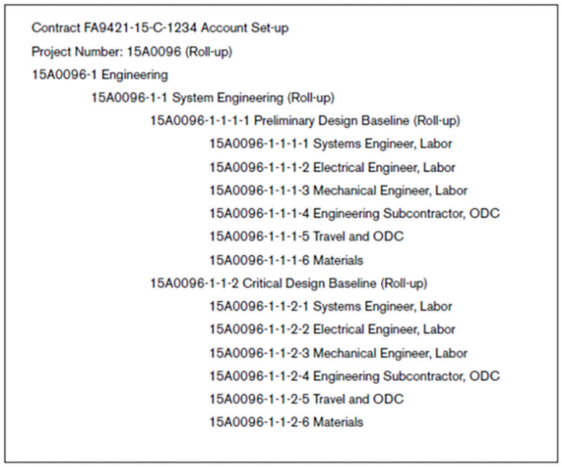
### *B.3.8 Labor*

Correct labor charging is essential:

> *"Unlike other costs, labor is not supported by external documentation or physical evidence to provide an independent check or balance. The key link in any sound labor time charging system is the individual employee. It is critical to labor charging internal control systems that management indoctrinates employees on their independent responsibility for accurately recording time charges. This is the single most important feature management can emphasize in recognizing its responsibility to owners, creditors, and customers to guard against fraud and waste in the labor charging function. (DCAA 2012)"*

Labor hours are collected using the timecard method where employees record their hours worked and associate those hours with particular charge codes—each representing a contract and a WBS

**FIGURE 4-19**. Typical Account Code Sample




element or work package. Periodically, the accounting system imports the labor hours and converts the hours to dollars, which are then recorded against the appropriate project.

The cost of labor is initially entered as a raw number derived by Employee X's timecard, which shows Employee X worked a certain number of hours at an hourly rate based on their wage rate or salary from the human resources database. However, the actual cost of the labor is more than what is paid to the employee in the paycheck—also included are fringe benefits, various overhead charges, and some fraction of general and administrative expenses.

This calculation to "burden" the raw labor rates is accomplished periodically and the results are then posted to the accounting system. This process may be accomplished weekly, biweekly, or monthly in a "closing" operation. Consequently, accounting data retrieved between closings may only reflect labor costs incurred as of the last closing—and may be anywhere from one week to several weeks in arrears.

### *B.3.9 Ensuring sufficient budgetary authority is available*

When performing federal contracts, the *Federal Acquisition Regulation (FAR)* and the appropriate agency supplements establish various reporting requirements concerning contract finances. The exact reporting requirements and format will be in the instant contract. However, the requirements one may typically encounter include the following clauses:

- The Limitation of Cost clause,
- The Limitation of Funds clause (for incrementally funded contracts),
- The Limitation of Government's Obligation clause (for incrementally funded fixed-price contracts from the Department of Defense (DoD)), and/or
- The Earned Value Management System clause.

The first two reporting requirements are defined as follows:

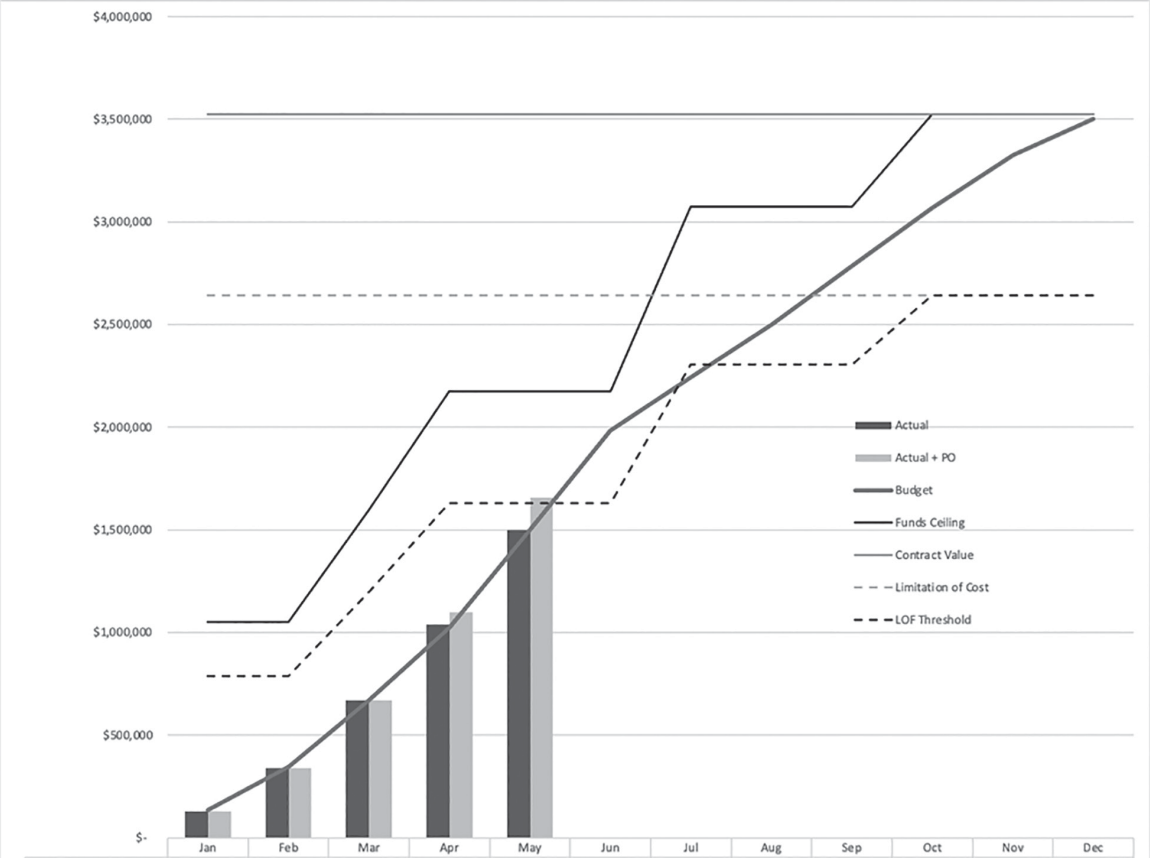
> [The] contract Limitation of Cost Clauses (FAR 52.232-20 and 21) and Limitation of Funds Clause (FAR 52.232-22) contain financial reporting requirements for cost-type contracts…. The limitation of cost and funds clauses in cost-type contracts require the contractor to advise the contracting officer in writing whenever the contractor has reason to believe that costs expected to be incurred under the contract in the next 60 days (may vary between 30 and 90 days) when added to all costs previously incurred, will exceed 75 percent (may vary between 75 and 85 percent) of the estimated total contract costs or funds allotted to the contract, respectively. The Limitation of Cost Clause also requires the contractor to notify the contracting officer when there are indications that the total cost for the performance of a contract will be substantially greater or less than the estimated total contract cost.

The Limitation of Government's Obligation clause (DFAR 252.232-7007) is a less-often-invoked reporting requirement applicable only to DOD fixed-price contracts with incremental funding. The reporting requirement here is as follows:

> [T]he contractor will notify the contracting officer in writing at least 90 days prior to the date when, in the contractor's best judgment, the work will reach the point at which the total amount payable by the government, including any cost for termination for convenience, will approximate 85 percent of the total amount then allotted to the contract for performance of the applicable item(s).

Reporting under the Earned Value Management System clause (DFARS 252.234-7002) can include a number of mandatory reports. One report that is often provided is the Contract Funds Status Report. This report is typically submitted on a DD Form 1586 or in a contractor-specific format that provides equivalent information. The prescribing language suggests the threshold be established at a contract value of $1 million or more and exclude fixed-price efforts. The contracting officer is encouraged to tailor the reporting requirements so as to ensure only the minimum data required is collected.

**FIGURE 4-20**. Financial Tracking Using an "S" Curve




| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Actual | $128,000 | $338,000 | $668,000 | $1,038,000 | $1,498,000 | | | | | | | |
| Actual + PO | $128,000 | $338,000 | $668,000 | $1,098,000 | $1,658,000 | | | | | | | |
| Budget | $135,000 | $347,000 | $669,000 | $1,026,000 | $1,503,000 | $1,985,000 | $2,245,000 | $2,500,000 | $2,785,000 | $3,070,000 | $3,325,000 | $3,500,000 |
| Funds Ceiling | $1,050,000 | $1,050,000 | $1,600,000 | $2,175,000 | $2,175,000 | $2,175,000 | $3,075,000 | $3,075,000 | $3,075,000 | $3,525,000 | $3,525,000 | $3,525,000 |
| Contract Value | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 | $3,525,000 |
| Limitation of Cost | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 | $2,643,750 |
| LOF Threshold | $787,500 | $787,500 | $1,200,000 | $1,631,250 | $1,631,250 | $1,631,250 | $2,306,250 | $2,306,250 | $2,306,250 | $2,643,750 | $2,643,750 | $2,643,750 |

Fulfilling these requirements will require both current and correct accounting data and comparing that data to the time-phased program budget. While there are several techniques for doing this comparison, one standard approach is the use of an "'S' Curve."

### *B.3.10 Creating and Using an "S" Curve*

The data in **FIGURE 4-20** represents the planned spending (blue line) by month based on data extracted from the budget. The graph represents the cumulative total (i.e., the sum of the current time period added to the sum of all previous time periods), and produces a distinctive plot as shown in the example.

Note that the heavy line starting at the bottom, left side of the graph (Budget) has distinct ranges:

- An accelerating sloped beginning,
- A straight-line region in the middle, and
- A tailing off over the final months.

This leads to the name "'S' Curve" for this type of chart. An "S" Curve represents how activities ramp up, stabilize and then tail off during a project. Also presented in this plot is a maximum cost ceiling (the contract ceiling of $3,900,000) and a dashed blue line representing 75 percent of the maximum contract value at 2,643,750.

The 75 percent line represents the FAR 52.232-20 Limitation of Cost reporting threshold. Notice of exceeding this value must be provided to the contracting officer 60 days prior to achieving it. The spending line crosses the 75 percent spent threshold in late August or early September, so the notice would be provided 60 days prior (probably June 30).

This basic chart is enhanced with additional data

representing actual expenditures, purchase order commitments, etc. and is typically used in briefings at periodic management reviews.

### *B.3.11 Incorporating Incremental Funding*

Many contracts are incrementally funded. Contractors may only receive a portion of the contract funding at the beginning of a contract and then (per FAR 52.232-22) notify the contracting officer when they need additional increments of funds (i.e., the "Limitation of Funds" notice) to continue working. Knowing where you are with respect to the funds ceiling and providing timely notice of the need for additional funds is a contract management necessity. Annotating the basic "S" Curve with additional information helps the contract manager stay aware of the funding status and when to provide notice to the contracting officer, as shown in the example in **FIGURE 4-20**.

Note how the chart includes additional information, such as the incremental funding value, the 75 percent reporting threshold for the incremental funding, actual costs to date, and actual (fully burdened) costs plus purchase order commitments. This chart offers the contract manager and the entire management team several insights, such as when the various "Limitation of Funds" and "Limitation of Cost" notices must be made, how actual costs are aligning with budgeted costs, etc.

### *B.3.12 Determining a "Funds Through" Date*

Contract financial management can often be condensed into a couple of data points. One of these is the date when contract funds will be expended.

On a cost-type contract, that date is when the contractor must stop work. Some will argue that a contractor could continue to work beyond this date "at their own risk," but doing so on a government prime contract is not advised. Working beyond the stop work date (i.e., "at your own risk") places the contractor in a position where there is no certainty that costs incurred during a funding gap will be recognized and paid by the buyer. Secondly, the buyer typically provides an admonition to contractors stating the government cannot allow contractors to work beyond their funding limits since if the contracting officer knowingly did so, contractors could run afoul of the Antideficiency Act. Consequently, the government will not knowingly permit a contractor to continue performance beyond the point where funds are exhausted. Therefore, determining a "funds through" date is essential.

Determining the funds through date requires interpreting the data used to create the budget and the performance to date. The "S" Curve in **FIGURE 4-20** provides a simple and easily interpreted representation of program budget, funding, and performance to date; however, this representation is still "driving by the rearview mirror" to some extent. Projected performance can be determined by reviewing the planned cost (heavy) line on the chart. Also, the planned revenue (i.e., projected cost + fee or the amount invoiced) will cross the funding line in mid-May and a "limitation of funds" notice should have already been sent requesting an additional increment of funding.

The "Cumulative Cost + Purchase Order Commitments" also took a big jump in the month of April. This reflects the letting of purchase orders or subcontracts for procurement of the prototype materials. Due to lead-time considerations, these materials must be purchased well in advance of their requirement. Consequently, the open commitment for the value of these purchases will be shown (ac-

**FIGURE 4-21**. Chart Data

| | Jan | Feb | Mar | Apr | May | Jun | Jul |
|---|---|---|---|---|---|---|---|
| **Budget** | *$135,000* | *$347,000* | *$699,000* | *$1,026,000* | *$1,503,000* | *$1,985,000* | *$2,245,000* |
| **Actual** | *$128,000* | *$338,000* | *$668,000* | *$1,038,000* | *$1,498,000* | | |
| **Funds Ceiling** | *$1,050,000* | *$1,050,000* | *$1,600,000* | *$2,175,000* | *$2,175,000* | *$2,175,000* | *$3,075,000* |
| **Actual + PO** | *128,000* | *$338,000* | *$668,000* | *$1,098,000* | *$1,658,000* | | |
| **Earned Value** | *$132,000* | *$344,500* | *$665,000* | *$1,035,000* | *$1,477,000* | | |
| **SPI (Cum)** | *0.98* | *0.99* | *0.99* | *1.01* | *0.98* | | |
| **CPI (Cum)** | *1.03* | *1.02* | *1.00* | *1.00* | *0.99* | | |
| **SPI** | *0.98* | *1.00* | *1.00* | *1.04* | *0.93* | | |
| **CPI** | *1.03* | *1.01* | *0.97* | *1.00* | *0.96* | | |
| **Cost Variance** | *$4,000* | *$6,500* | *($3,000)* | *($3,000)* | *($21,000)* | | |
| **Cumulative Cost Variance** | *$4,000* | *$10,500* | *$7,500* | *$4,500* | *($16,500)* | | |
| **EAC** | *$3,572,545* | *$3,516,399* | *$3,520,053* | *$3,481,565* | *$3,556,611* | *$3,556,611* | *$3,556,611* |
| **Contract Value** | *$3,900,000* | *$3,900,000* | *$3,9000,000* | *$3,900,000* | *$3,900,000* | *$3,900,000* | *$3,900,000* |
| **Limitation of Cost** | *$2,925,000* | *$2,925,000* | *$2,925,000* | *$2,925,000* | *$2,925,000* | *$2,925,000* | *$2,925,000* |
| **LOF Threshold** | *$787,500* | *$787,500* | *$1,200,000* | *$1,631,250* | *$1,631,250* | *$1,631,250* | *$2,306,250* |

crued) from the time of the order to the date when the vendor is paid, whereupon the amount is shown as an actual cost.

A look at the chart's underlying data (see **FIGURE 4-21**) confirms the existence of one or more open commitments in April amounting to $60,000. This is the difference between "Actual Cost" ($1,038,000) and "Actual Cost + Commitments" ($1,098,000).

Funds remaining is the difference between the contract ceiling less Cost + Fee (invoices to date), and commitments. What is unknown is how far those remaining funds will propel the project. That requires some forecasting. The budgeted cost for June is $482,000 and for July is $260,000. However, these are burdened costs minus fees. To accurately project a funds through date we must include a pro-rata portion of the fixed fee (assumed to be 5.5%) or $26,510 for June.

Therefore, funds remaining at the end of June would be $517,000 - $ 490,490 = $26,510. Without an additional funding increment, work would have to stop sometime in the first week of July. The foregoing is based on assumptions that the planned costs will be incurred in the amount specified and at the time planned.

### *B.3.13 Where's the Finish Line?*

Obviously, the availability of financial data opens the door for more analysis opportunities and even more complex charts. How much or how little information added to the basic 'S' Curve is totally up to the financial manager and the needs of the organization. However, it is important to consider an "estimate at completion" (EAC) and earned value.

#### *B.3.13.1 Estimate at Completion (EAC)*

Knowing the actual costs incurred through the status date and the work remaining lends itself to an EAC. If a true EACis not used, then the data supports making at least a somewhat educated guess of whether the work can be completed within the funds remaining. True EAC calculations cover a lot of ground and include factors not yet considered. However, a very rudimentary estimate can be obtained by adding the cost of work remaining to the cost of work accomplished to date.

Actions based on that analysis will largely depend on contract type (i.e., fixed-price or cost-reimbursement). For a fixed-price contract, the obligation is to finish the work and the compensation will be the agreed-upon fixed contract price. If the contract is a cost-type contract, the obligation is to make the best efforts to accomplish the work within the contract cost ceiling. If the contract is incrementally funded, a second obligation is to not incur costs in excess of the incremental funding limit. If the EAC shows it is likely that there will likely be an overrun or a significantly underrun of the contract ceiling cost, it is the contractor's obligation to promptly notify the contracting officer if the FAR 52.332-20 clause is in the contract.

#### *B.3.13.2 Earned Value*

The "S" Curve provides much of the necessary data to generate the earned value management system (EVMS) reports—albeit without the necessary management controls and infrastructure needed to truly do an EVMS implementation. The additional value of EVMS is an assessment of the progress made in return for the funds expended. That is, if 25 percent of the contract's value is spent, has 25 percent of the work been accomplished? This relationship (work completed versus the cost of doing that work) is the underlying foundation of EVMS.

Its contribution to the analysis in this section is that including the "earned value" allows one to differentiate between money spent and work accomplished. Hopefully, the relationship is such that each dollar spent returns one dollar worth of progress. However, EVMS does not take that relationship for granted. An EVMS provides a better indication of whether the contractor is on budget and on schedule than the simple "S" Curve.

### *Section Summary*

Financial management involves creating a plan (budget) and then measuring performance against that plan. Variances from the plan should be identified and investigated. Unlike many standard business accounting approaches where budgets and costs are allocated in lump sums to departments, government contracts use a job-based or contract-based accounting approach that allocates costs to specific "final cost objectives" (i.e., contracts), thus providing insight into how contract funds were spent.

Tracking performance to the plan is a traditional management function (controlling) with several enhancements added based on the job cost accounting method. One complicating aspect of government contracts is the ability of the buyer to incrementally fund the contract effort, which requires close monitoring of expenditures and commitments to avoid running out of funds and incurring a work stoppage.

## B.4. Project Management

(By Steve Olson, PMP, MSPM, president, CMS Group, Inc.)

Project management is the planning, organizing, directing, and controlling of all aspects of a project. If organizational resources are not available to develop and execute the project, then the contract manager is engaged to find a contractual solution. Successful contract managers understand how projects are developed and executed, and they understand the relationship between contract managers and project managers throughout the contract life cycle.

Properly applied, project management helps to ensure that the project meets its objectives safely, and within agreed-upon time, cost, and performance criteria. Project management overlaps general management in many areas such as communication and decision making and differs in others such as motivating staff because project managers seldom have direct control over all the resources needed to do their job (IPMA-USA 2008).

While project managers are responsible for working in cross-functional teams to closely manage new initiatives from start to finish, contract managers are responsible for keeping track of every deadline, deliverable, and other obligations laid out in an organization's contracts. The commonality of both contract management and project management functions for specific projects are that they are temporary and sooner or later will come to an end (e.g., the objective has been fulfilled, exhausted financial resources, etc.).

Organizations use projects and programs to create change in business processes and value for the enterprise. Projects are often utilized as a means of accomplishing an organization's strategic objectives. The following section presents knowledge on project management and how it can impact contract managers. The perspective of this section is from the buyer's organization and is applicable to both the government and commercial sectors. However, contract managers in the sellers' organizations should also understand this relationship. This understanding will help to clarify the roles of contract managers and project managers, especially when establishing and utilizing communication channels. The following areas are presented in this section:

B.4.1 Project Management Overview

B.4.2 Scope, Objectives, and Benefits of Projects, Programs, and Portfolios

B.4.3 Contract Manager and Project Manager Interfaces

B.4.4 Causes of Failed Projects and Contract Claims or Disputes

B.4.5 Project Management Key Terms, Definitions, and Acronyms

### *B.4.1 Project Management Overview*

Projects are typically created because of one or more of the following situations:

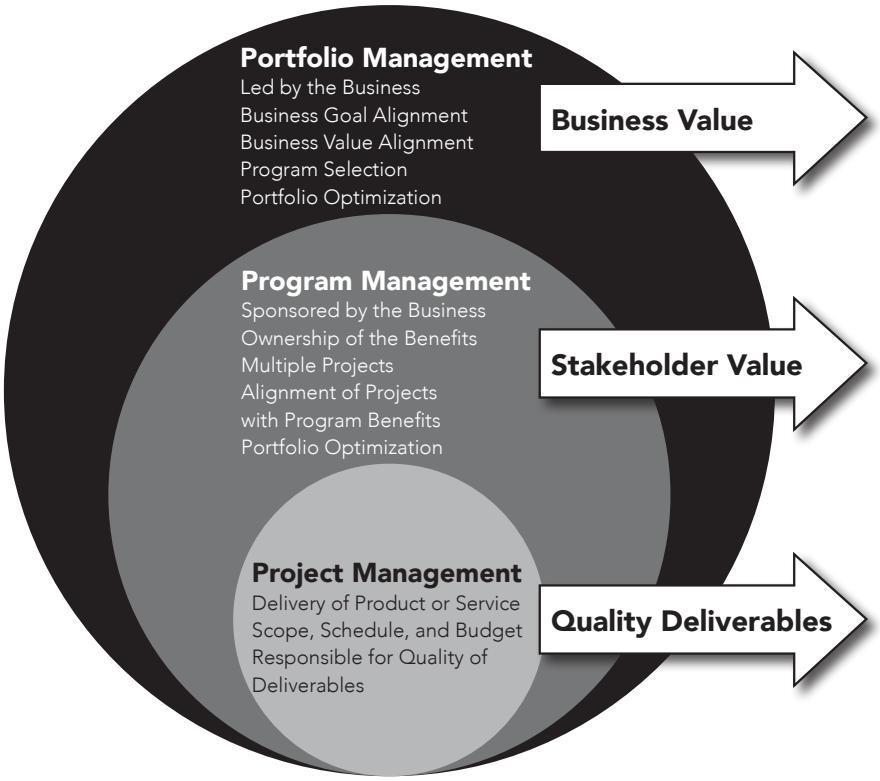
- *Customer requests.* A customer decides to outsource their payroll department to a third-party seller. The seller initiates a project for transitioning the services from the buyer to their staff.
- *Social needs.* A city's town council decides to renovate a building to accommodate the growing population of homeless people.
- *Business need.* A business must revamp its production line to increase productivity and quality to remain competitive.
- *Market demand.* A business must update their equipment to respond to demand for a new lightweight waterproof fabric which their equipment cannot currently handle.
- *Strategic opportunity.* A car manufacturer has an opportunity to exploit a market in which a competitor has gone out of business.
- *Legal requirement.* A car repair business is required to update their paint booths to reduce their volatile organic compounds and emissions to meet new regulatory requirement standards.
- *Technological advances.* A business decides to design and fabricate a new body armor suit for the military using an innovative new lightweight and waterproof fabric.

### *B.4.2 Scope, Objectives, and Benefits of Projects, Programs, and Portfolios*

*Project.* Projects are unique endeavors undertaken to produce a product, service, or an organizational change. Projects are one-time occurrences that have a defined start and finish point. Even though each project is unique, many have similar characteristics.

*Project objectives.* Project objectives are usually defined and handed down from the project sponsor in order to accomplish specific business goals and

**FIGURE 4-22.** Project, Program, and Portfolio Value Drivers (Contract Management Solutions (CMS) Group, Inc.)




objectives. They provide the basis for making decisions about project scope, schedule, cost, quality organizational impact, or procurement needs (IPMA-USA 2008).

Project strategies provide guidance about how the project will achieve its objectives. While project strategies are determined before the project starts, they may need to be revised as new situations develop. Project strategies are very different than the organization's business strategy in that they are the tactical methods of achieving the organization's strategy and often need to be reprioritized (IPMA-USA 2008).

The output of a project may be either tangible or intangible. An example of a tangible project output could be a new product or a redesign of a current product, or a result such as a new procedure manual. An intangible project output could be an organization's improvement in how they provide their service faster or better.

*Project Scope*. Project scope is the work required to deliver the product or outcome of the project. Project scope may include work efforts that are not intended for a buyer or a customer, for example, to produce new capabilities to provide a product or improve their service. The project scope describes what is included in the project and what is outside or beyond the scope of the requirements. Often the project scope is a direct correlation to a contract's statement of work (Project Smart 2017).

When the scope is well defined, it can limit scope creep and mitigate disputes about project and contract changes. An important point about defining a project's scope is that it needs to include all stakeholders' needs and requirements. The identification of all key stakeholders is vital before developing the project's scope, otherwise all stakeholders may not consider the project a success if their individual needs and requirements were not met. Some projects define their scope in steps or by phases in the project life cycle. Project scope may also be derived from a detailed breakout of the work using a Work Breakdown Structure (WBS), which breaks the project up into smaller, more manageable pieces. (See Section B.3.2 in this chapter *CMBOK* 2.2.4.)

*Program*. A program is a group of projects and subprojects that are interdependent for the program's success. These projects and subprojects happen

in different stages, phases, sequences, or even in parallel.

Programs can achieve outcomes and benefits that aren't possible through independent project management because programs focus on the interdependencies and optimizing the management of them as a whole. Common activities of a program and program manager may include resolving conflicts between the projects over staffing and skilled resources, or realigning project objectives in response to changes in the overall business strategy.

Like projects, programs also benefit from the support of a Program Management Office (PMO). PMOs can help with the coordination of resources, administrative support such as billing and accounting, and providing common processes and tools across all projects to ensure consistent methods are used by the individual projects. Program Management Offices can also help manage contracts, both as a buyer and a seller. They may help manage the customer relationship with the company's external customers or help manage subcontracts as a buyer.

*Portfolios.* A portfolio includes all the programs and projects in an organization. It could serve as representative for the organization as a whole, or possibly for individual lines of business. There can also be more than one portfolio in an organization depending on its size and complexity. Portfolios provide the organizational oversight and selection of the projects and programs that will help them best accomplish their overall business goals and objectives. The projects and programs that have the capability of contributing the most to the organization's realization of goals and benefits usually receive priority and resources they need to be successful. Portfolios evaluate newly proposed and in-flight projects and programs against the criteria they establish such as the amount of time before they break even, the amount of risk they're willing to accept, or their expected return on investment.

Projects, programs, and portfolios all have different scope and objectives, and provides different benefits and value to the organization (see **FIGURE 4-22**). **FIGURE 4-22A** presents a comparison of project, program, and portfolio scope, objectives, and benefits to the organization and stakeholders.

*Relationships between Contracts and Projects.* There are two types of relationships between contracts and projects. The first is the parent–child relationship (i.e., the first project initiated the other). The second is the relationship between failed projects and troubled or failed contracts.

An example of a parent–child relationship would be a contract for products and services. For a seller, a contract with the buyer requires the need for the buyer to initiate a project or program for delivering products and services. The other scenario would be of a project that needs to procure goods or services they need to complete the project, and these projects can be both internal and external to the organization.

Contracts and projects share many attributes that require advanced education, professional training, and occupational experience:

- Both start out as a business need or requirement;
- Both have stakeholders;
- Both require authorization, approval, or agreement before they can begin;
- Both have sponsors, managers, and teams responsible for their performance and compliance;
- Both have standard methods and disciplines for their management;
- Both are dependent on each other for their success; and
- Both are critical to accomplishing the business' objectives (overall mission or strategy).

**FIGURE 4-22A.** Comparison of Project, Program, and Portfolio Scope, Objectives, and Benefits (CMS Group, Inc.)

| | Project | Program | Portfolio |
|---|---|---|---|
| **Scope** | Single project | Multi-project | Proposals, programs and projects |
| **Objective** | Deliver promised results | Coordination and communication among its projects | Investment and benefits optimization |
| **Benefit** | Reduce risk | Deliver business outcomes | Resource allocation and optimization |

### *B.4.3 Contract Manager and Project Manager Interfaces*

There are several interfaces between contract managers, project managers, their organizations, and the client. Each interface in this section illustrates what information is exchanged and who is responsible for providing it.

#### *B.4.3.1 Project Manager Interfaces*

The project manager has many interfaces within their organization and is dependent upon many of them at one point or another for the success of their project (see **FIGURE 4-23**). In some instances, the contract manager may be the project sponsor.

Another important point is that many of these interfaces are with the contract and project stakeholders who are also dependent on the success of the contract and project.

The contract manager's organizational interfaces are presented in **FIGURE 4-24**. The contract can serve as the vehicle for how the organization will achieve its strategic goals and objectives through their projects, programs, and portfolios, and the contract manager is the link between the contract and the projects that enables the achievement of the organization's goals and objectives.

**FIGURE 4-25** presents a combined view of the contract manager's and project manager's interfaces.

#### *B.4.3.2 Interfaces Throughout the Contract Life Cycle*

Contract managers and project managers share the common responsibility for the overall accountability of the contract or project. The likelihood for the success of the contract and project performance increases when contract managers and project managers work closely throughout the contract life cycle. **FIGURE 4-26** presents a comparison of the primary responsibilities of the contract manager and project manager.

Without effective planning and successful execution of the contracts or projects, the achievement of the business' goals and objectives are unlikely. For each project, the contract manager provides the following to the project manager:

- The contract, which contains the negotiated scope and compliance requirements,
- The customer's expectations, and
- Contract interpretation when there are questions or issues about contractual requirements or acceptance criteria.

**FIGURE 4-23**. Project Manager's Organizational Interfaces (CMS Group, Inc.)

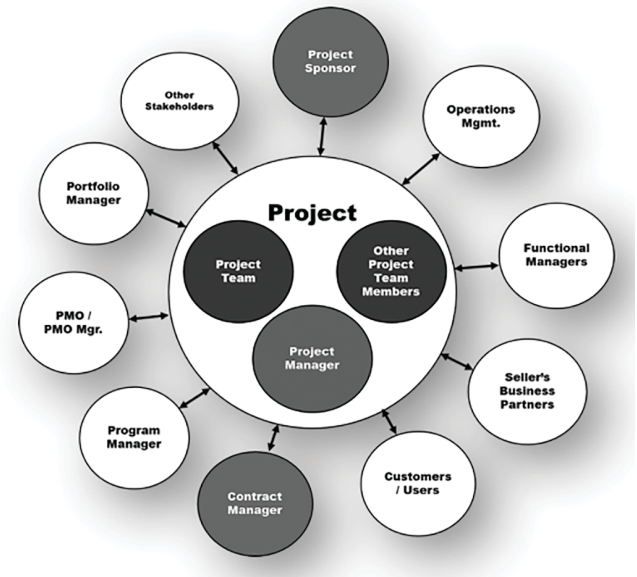



**FIGURE 4-24**. Contract Manager's Organizational Interfaces (CMS Group, Inc.)


The project manager provides the project's performance reports and status to the contract manager. If the client requests any changes during the project they will document the client's requested change and review it with the contract manager to determine if it is in or out of the scope of the contract, the impact, and how to respond to the client's request. The project manager's interface with the client is to

**FIGURE 4-25**. Combined View of Interfaces (CMS Group, Inc.)

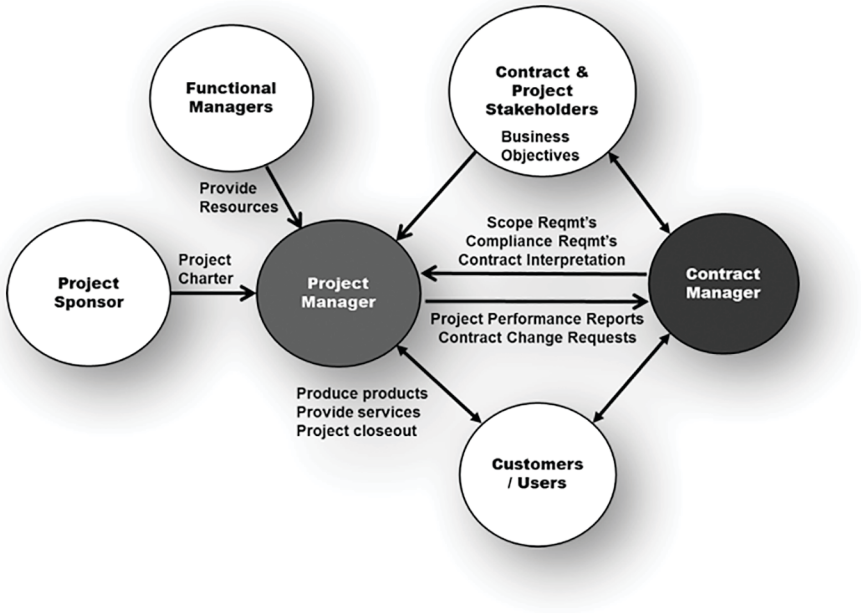



**FIGURE 4-26.** Comparison of Primary Responsibilities (CMS Group, Inc.)

| Contract Manager: Responsible for Contract Compliance | Project Manager: Responsible for Project Performance |
|---|---|
| Primarily responsible for contract management | Overall accountability for the project and the project management team |
| Contract drafting, negotiation, and execution | Project administration (e.g., change management, communications, etc.) |
| Monitor contractor's performance | Project planning, initiation, control, management, and execution |
| Provide contract interpretation and resolve disputes | Single point of contact for client's project executive or representative |
| Ensure contracts are compliant with all government regulations and requirements | Liaison between the client and the project manager's organization |
| Responsible for settling terminations and settling claims | The project manager is the leader of the project management team |
| Authority to obligate funds to enter into new contracts, modifications, or termination | Consistent communication between the client and the project manager's organization |

provide the contracted products or services, and when the project is complete conduct the project closeout. Any project associated with a contract must be closed out and signed off by the client before the contract can be closed out. If there are multiple projects associated with the contract, all must be closed out and approved by the client and provided to the contract manager for their records.

#### *B.4.3.3 Interfaces During the Pre-Award Life Cycle Phase*

There are several project management processes or activities within the pre-award life cycle phase. Each step has different interfaces and exchanges of infor-

**FIGURE 4-27**. The Project Manager's Interface During Requirements Determination Process (CMS Group, Inc.)

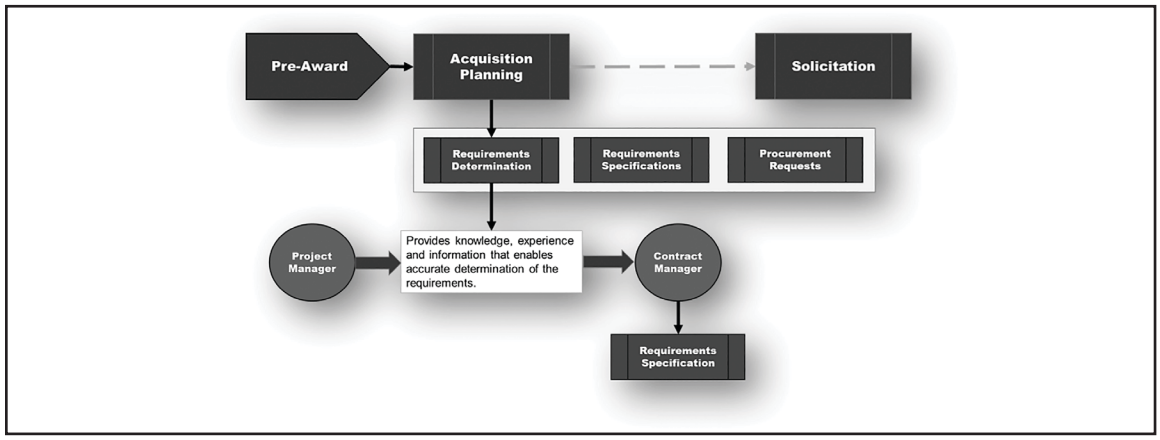



**FIGURE 4-28**. Project Manager's Interface During the Requirements Specification Step (CMS Group, Inc.)

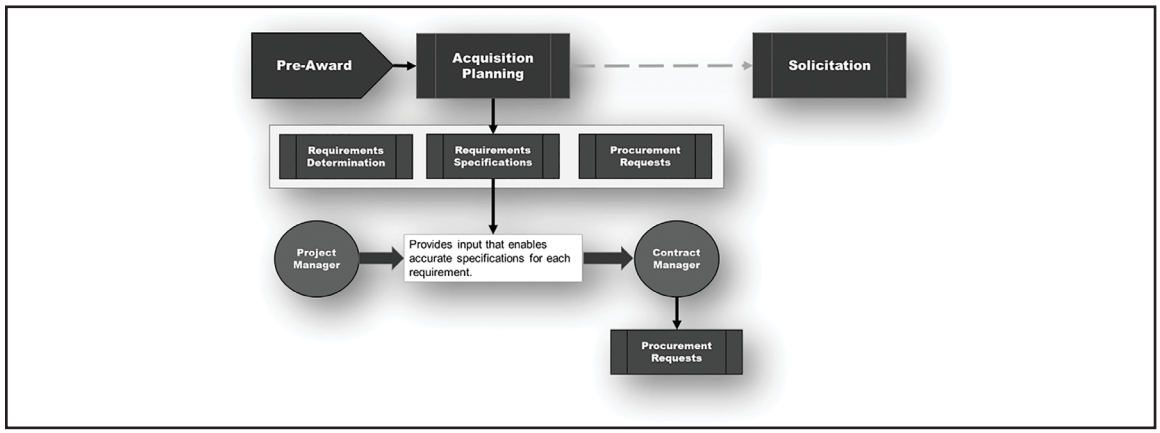
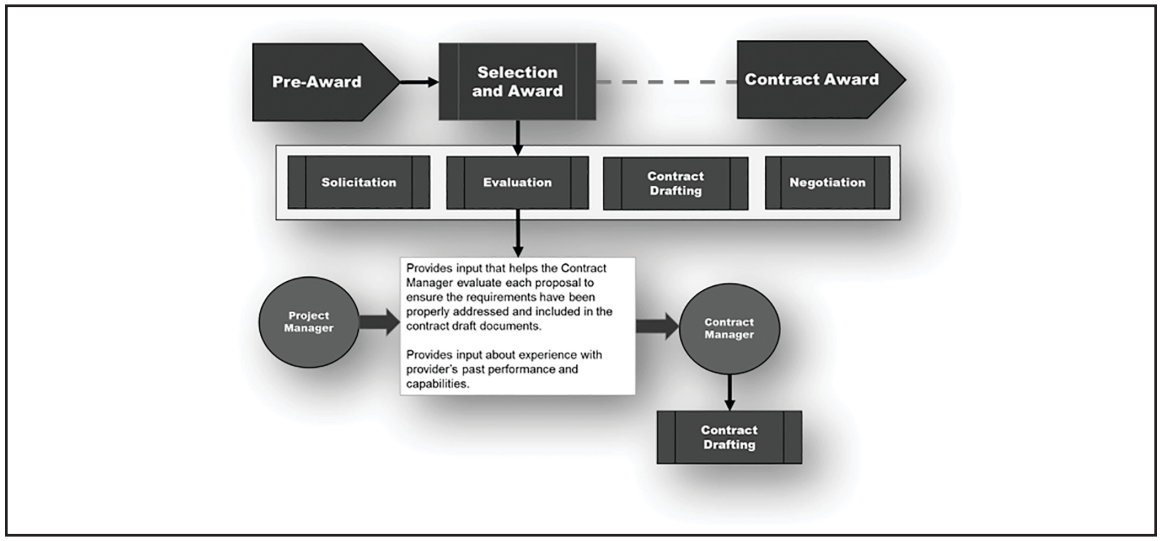



**FIGURE 4-29.** Project Manager's Interface During the Evaluation Process (CMS Group, Inc.)



mation between the contract manager and project manager. These steps include:

- Requirements determination,
- Requirements specification, and
- Procurement requests.

During the requirements determination step (see **FIGURE 4-27**), feedback should be obtained from appropriate subject matter experts and project managers to help define each requirement accurately.

For the requirements specification step (see **FIGURE 4-28**), it is advisable for the contract manager to engage and collaborate with the project manager to help define the requirements that will be written into the contract, especially since the project manager will be responsible for monitoring the performance and delivery of those requirements. The project manager's knowledge and experience with each requirement provides valuable advice which the contract manager uses to crisply define the scope and requirements. The better the requirements are understood and defined in the contract, the more likely the project will be successful.

With an accurate specification in hand, unless there are questions or concerns, the contract manager can now work independently of the project manager in the procurement request step to develop the solicitation.

#### *B.4.3.4 Interfaces During the Pre-Award Phase/ Selection and Award Process Step*

The next interface will be when the contract manager requests or assigns the project manager to evaluate the technical solutions offered by sellers (see **FIGURE 4-29**). The project manager can provide verification that the requirements have been properly addressed or not.

The contract drafting (a.k.a., forming the contract) step provides another opportunity for the contract manager to interface with the project manager (see **FIGURE 4-30**). This is a very important interface because, if there are negotiations, the project manager can help the contract manager determine any possible flexibility with the definitions and acceptance criteria for many of the contract's deliverables. This will protect the integrity of the specifications and acceptance criteria. Risk can be mitigated and avoided by incorporating the project manager's input into the contract.

During the negotiation process, the project manager should validate the requirements being drafted into the contract. This is an important step for ensuring the requirements are achievable and clearly understood by both parties. **FIGURE 4-31** illustrates the project manager's interface during the negotiation process.

#### *B.4.3.5 Interfaces During the Contract Award Phase*

During the award phase, the project manager can provide advice or additional insight concerning an interested offeror's value proposition and capabilities that may serve the best interests of the organization. This insight should be used in addition to the information available to the contract manager. **FIGURE 4-32** displays the project manager's interface during the source selection process.

#### *B.4.3.6 Interfaces During the Post-Award Phase*

Possibly the most important internal organizational meeting after contract signature is the handover meeting between the contract management team (the promise makers) and the project management team (the promise keepers).

This meeting sets the tone with the expectations of the management of the contract and internal relationships. For the project management team, it may be the only time they will be able to review their new contractual requirements with the solution design architects and technical solution managers face-to-face and be able to discuss the assumptions and dependencies for the solution(s).

This is also a good time to discuss any contractual requirements about governance and how the project management team will administer the project activities such as the management of issues, risks, deliverables, changes, communications, and how decisions and approvals will be made. The project manager should have a checklist of all the information their team needs for the project which should be the input for establishing the agenda and topics and ensuring that the appropriate people on the acquisition team are available to present that handover to them.

If the agenda items on the list above are covered well, the project management team should have a very good idea of the scope and requirements, what they are expected to do, and the expected results. Unclear scope, requirements and expectations are leading causes of failed projects and contracts, so

**FIGURE 4-30.** Project Manager's Interface During the Contract Drafting Process (CMS Group, Inc.)

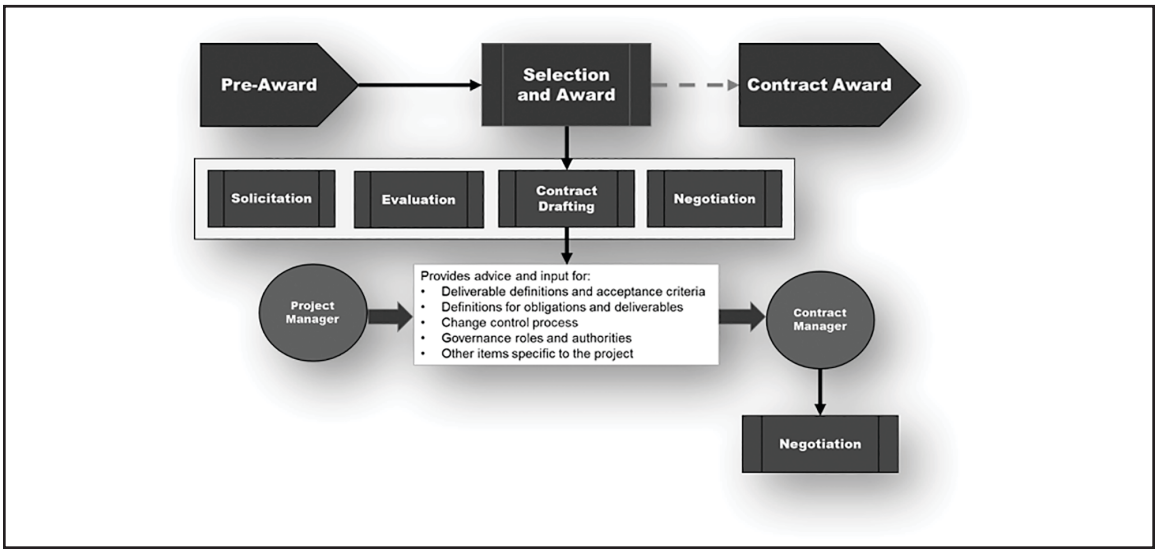



**FIGURE 4-31.** Project Manager's Interface During the Negotiation Process (CMS Group, Inc.)

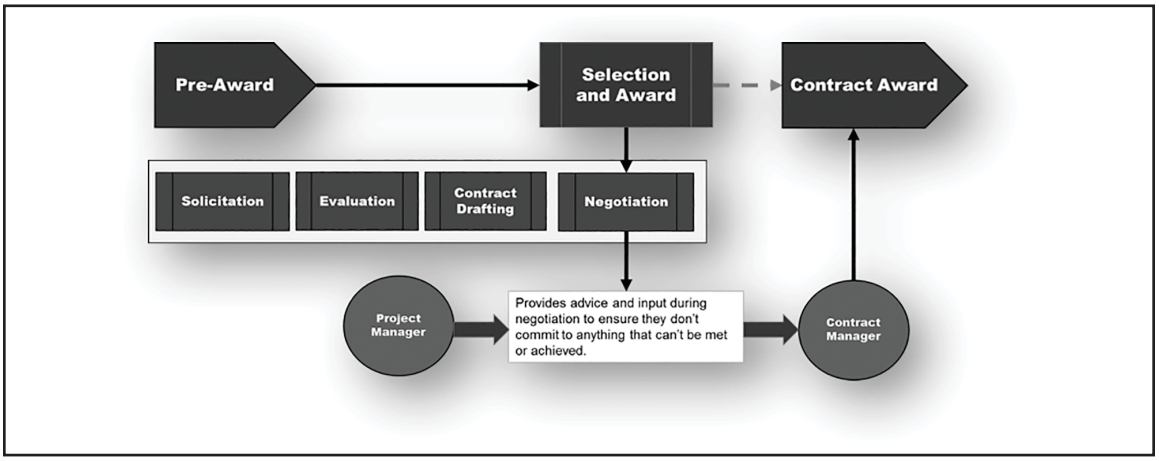
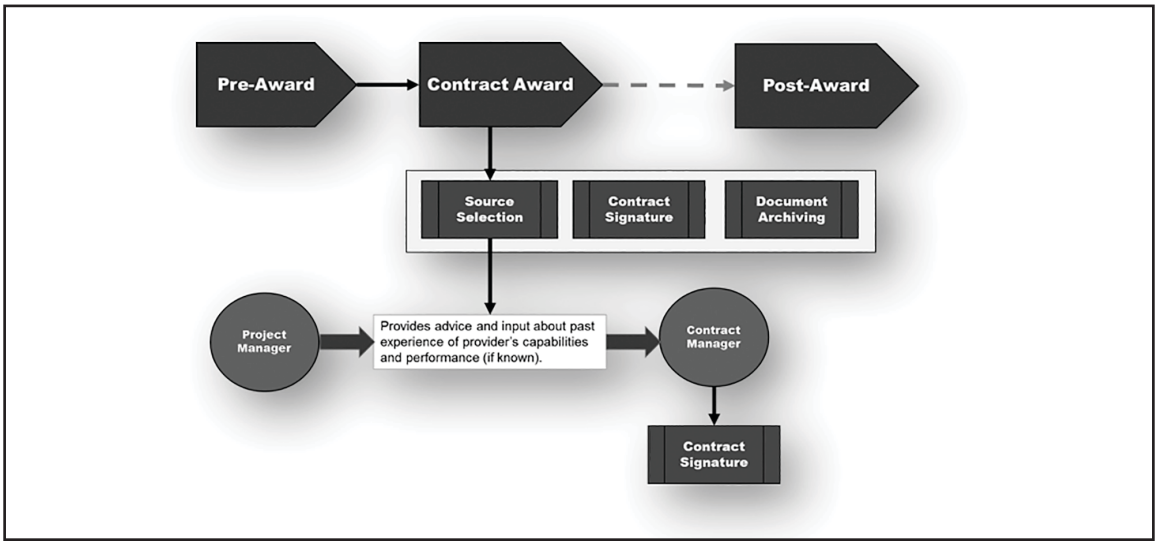



**FIGURE 4-32.** The Project Manager's Interface During the Source Selection Process (CMS Group, Inc.)



this meeting is the best opportunity to make sure they are known. **FIGURE 4-33** presents the project manager's interface with the contract manager's team during the handover meeting.

### *B.4.3.7 Detailed Contract Analysis*

A detailed contract analysis is a very valuable work product. This document lists all the contractual obligations and requirements for the seller and the buyer. The list contains the information extracted and provided in the form of a contract calendar that listsevery "seller will or shall" deliverable and its due date (if known) down to the task level. It also includes other information needed by the contract manager and project manager to help them understand what all the contract requirements are and to help them manage the contract and project. Armed with this information about all their contractual requirements and obligations, the project manager and team can then start to effectively plan the resources and schedule them for when they are needed. The project management team depends on the contract to provide the list of their required obligations, deliverables, and expected performance results. In addition, the contract manager must communicate anything else the project management team needs to know to complete their project successfully. **FIGURE 4-34** presents the contract manager's and project manager's review of contract analysis.

### *B.4.3.8 Project Performance Reporting*

There are many tools, techniques, and methods for reporting and assessing project performance. The important point about this interface between the contract manager and the project manager is there are certain measurements and data that can be provided with great insight about the project's performance. Examples include earned value analysis measurements such as schedule or cost variance, or schedule or cost performance indexes. This information provides better help and guidance to the project manager. Caution should be exercised when using performance measurements to make important decisions about the project.

#### *B.4.3.8.1 Project Controlling*

In recent years, an adaptation of established traditional project controls known as "Project Controlling" has emerged. Project controlling includes five main aspects: project monitoring, project assessment, reporting, project steering and initiating project changes. Establishing a *project controlling unit* that has no business interest with the various contractors but takes responsibility for project progress across the project ensures that it can provide consolidated independent guidance to the client. This eliminates situations where information is provided directly by contractors who may seek high value changes to be added based on their own suggestions.

##### B.4.3.8.1.1 Project Controls vs. Project Management in the Contract Management Life Cycle

Project controls and project management have overlapping functions. Both processes help keep a project on track and within scope. However, project controls are not as broad in their purpose as project management. While project management focuses on keeping the entire project on track, including people, processes, and deliverables, project controls focus specifically on quality control to save time and money.

The measurements and analysis used are only as good as the accuracy of the data used to generate

**FIGURE 4-33.** Project Manager's Interface with the Contract Manager's Team During the Handover Meeting (CMS Group, Inc.)

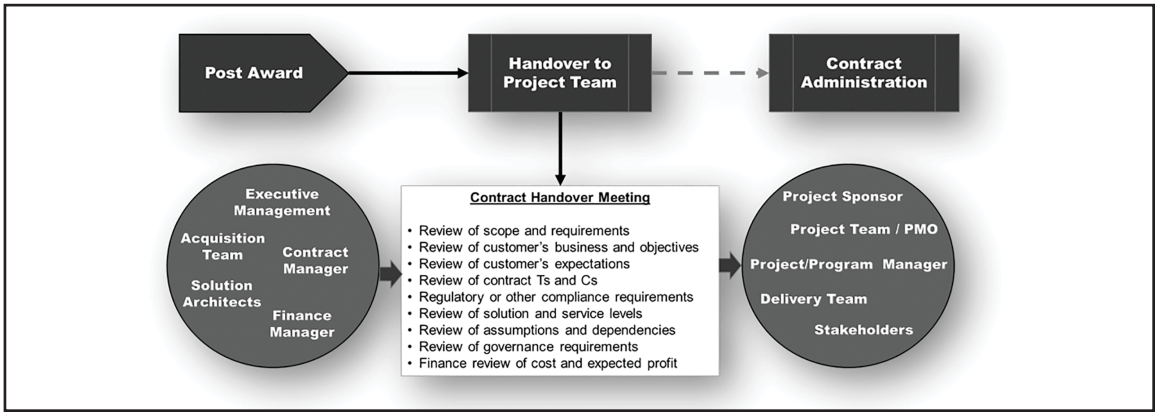
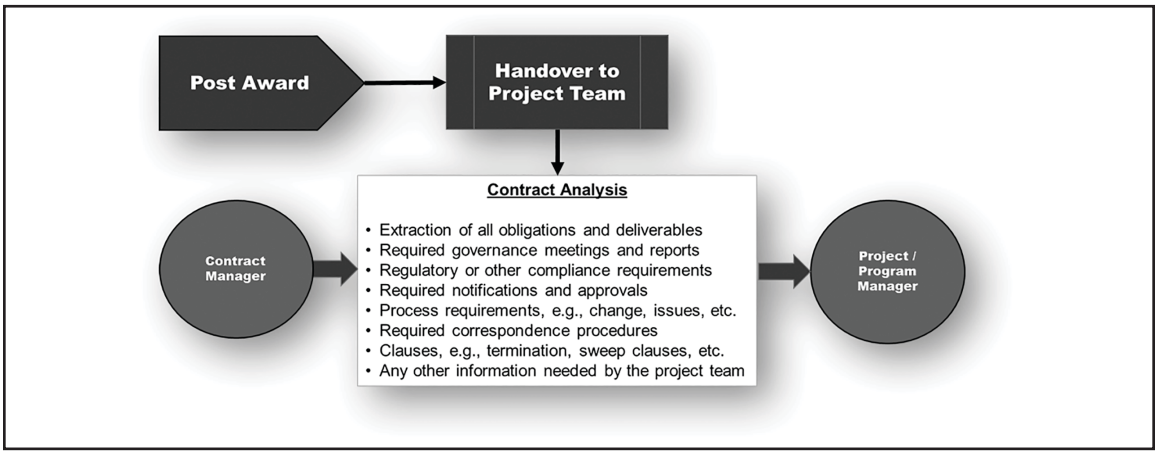


**FIGURE 4-34.** The Contract Manager's and Project Manager's Review of Contract Analysis (CMS Group, Inc.)




the measurements. During the change of hands from the contract manager to the project manager, project controls are established based on the established contract requirements and evaluation criteria. Therefore, proactive measures of risk avoidance or reactive measures of risk and dispute resolutions should be minimized when the planning team has completed due diligence and includes all parties of the contracts and project management team. Overlap from contract management to project management teams and finally to project controls is a positive reinforcement of the quality assurance process rather than a redundancy. To further illustrate the continuous overlap of contract management to project management and throughout to the project controller for compliance and monitoring optimization, see **FIGURE 4-35**.

**FIGURE 4-36** presents the interface during contract performance and compliance monitoring.

### *B.4.3.9 Quality Assurance Reports*

This interface during the quality assurance step is also very important due to the ramifications of poor quality or late delivery. Failed delivery and failed (rejected) deliverables are leading causes of contract claims and disputes. Everything that can be done to ensure deliveries are on time and the expected quality is provided is the best way to avoid this problem. **FIGURE 4-37** illustrates the interface during quality assurance.

**FIGURE 4-35**. Contract Management and Project Management Overlap with Project Controller Oversight (contributed by the JTOA Corporation)

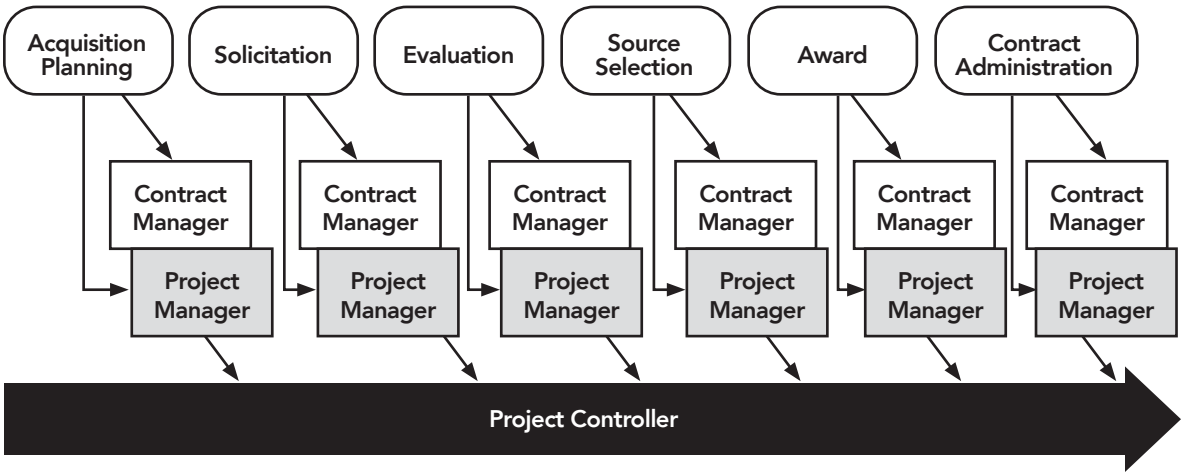


**FIGURE 4-36.** The Interface During Contract Performance and Compliance Monitoring (CMS Group, Inc.)

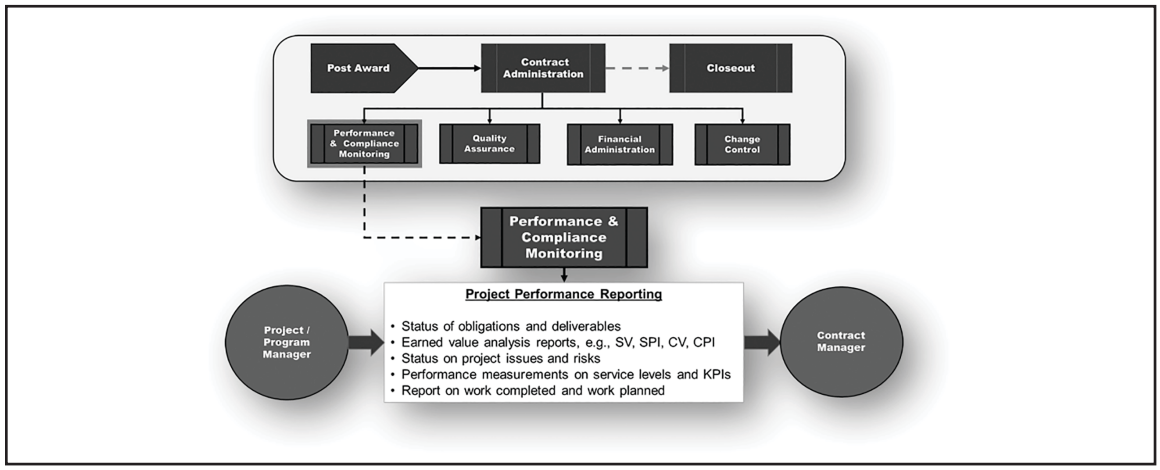



**FIGURE 4-37.** The Interface During Contract Administration and Quality Assurance (CMS Group, Inc.)

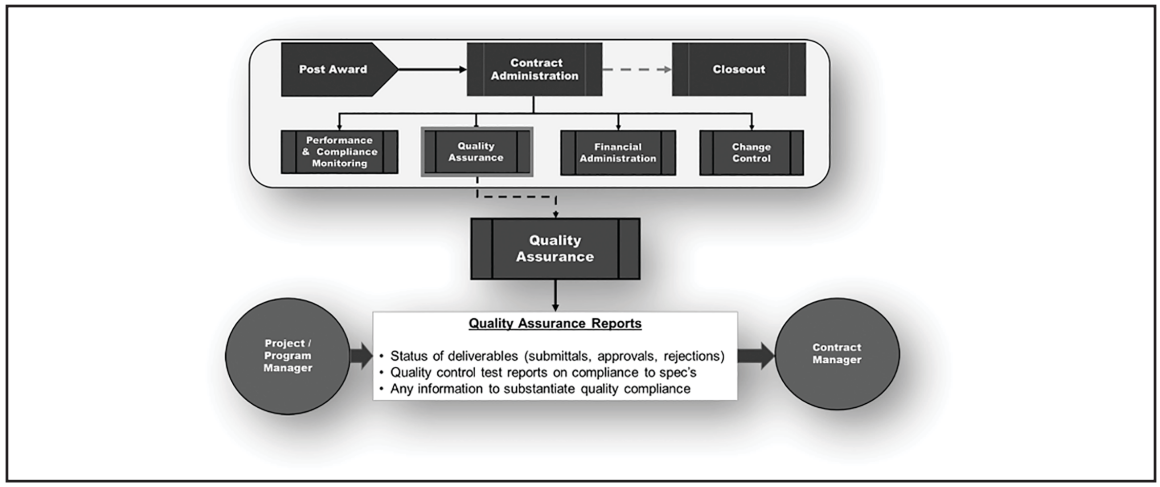



**FIGURE 4-38.** The Interface During Financial Administration (CMS Group, Inc.)

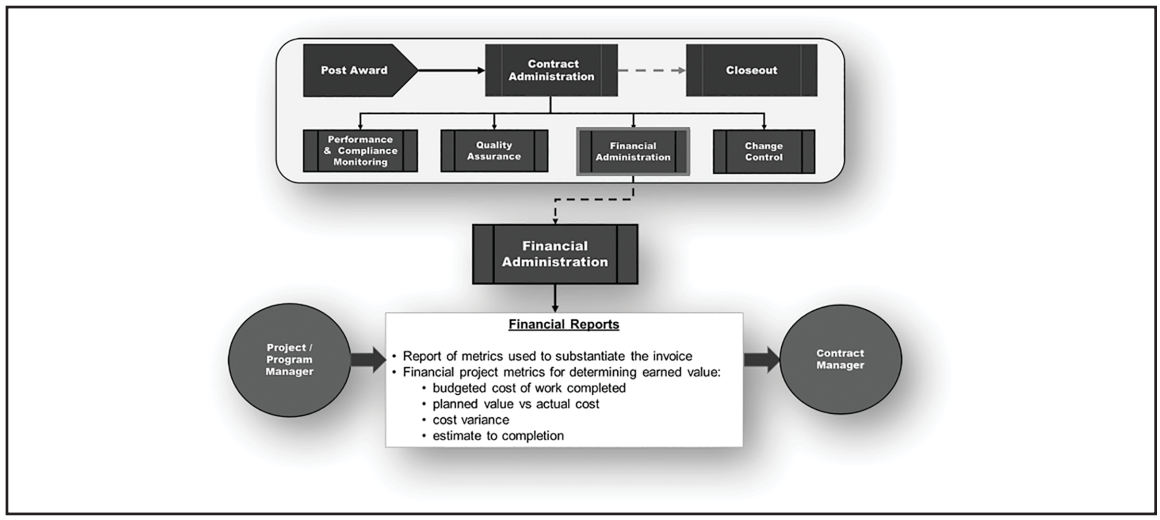
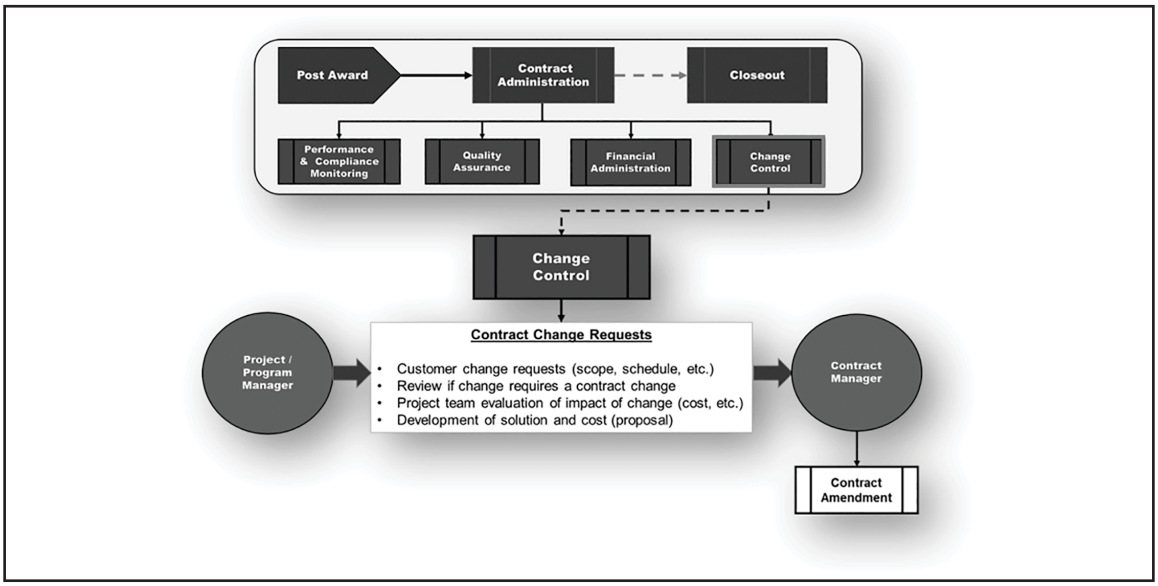


**FIGURE 4-39**. The Interface During Change Control (CMS Group, Inc.)




### *B.4.3.10 Financial Administration*

During the financial administration step, the project manager provides the contract manager with reports to demonstrate:

- What work was completed and needs to be invoiced for;
- The supporting documentations to substantiate the invoices;
- Depending upon the type of contract, the earned value metrics for determining if the project is ahead or behind schedule; and
- If they are over or under budget.

This is the information that helps the contract manager make better decisions and become better equipped to talk to the finance manager when needed. **FIGURE 4-38** presents the interface during financial administration.

### *B.4.3.11 Contract Changes*

Another leading cause of failed projects is lack of proper change control. Change control is very important because without it, projects may experience unaccountable scope creep. Depending upon the type of contract used, scope creep can eat away at cost and reduce profitability—also known as "value leakage." In contract changes, the project manager can provide valuable help and information. It is possible for a customer to request more of what is contracted for or to request additional service or products that is outside the scope of the contract.

In this instance, the project manager would bring the customer's request to the contract manager to discuss its assessment and planned response, which could generate new revenue and additional profits for the seller.

The post-award interfaces between the contract manager and project manager also occur when the contract manager is required to participate in one of the project's governance activities or to help resolve an issue or claim. Examples of governance process activities could include the need to evaluate a client request for a change to a key milestone date requiring a contract change, or a need to interpret contract language around a deliverable where the acceptance criteria is not defined and cannot be agreed on. There may also be one of the project's steering or management committees that require their attendance and input.

It is important the contract manager and project manager understand each other and communicate and work well together. Teamwork is fortified when communication flows freely and each side is appreciative when one keeps the other informed about up-coming needs as much in advance as possible. **FIGURE 4-39** illustrates the interface during change control.

Effective contract administration is integral to successful project management. In projects that involve extensive procurement activities—that is, when a contractor performs critical aspects of the project effort—the effectiveness of the contract

**FIGURE 4-40** The Interface During the Contract Closeout (CMS Group, Inc.)

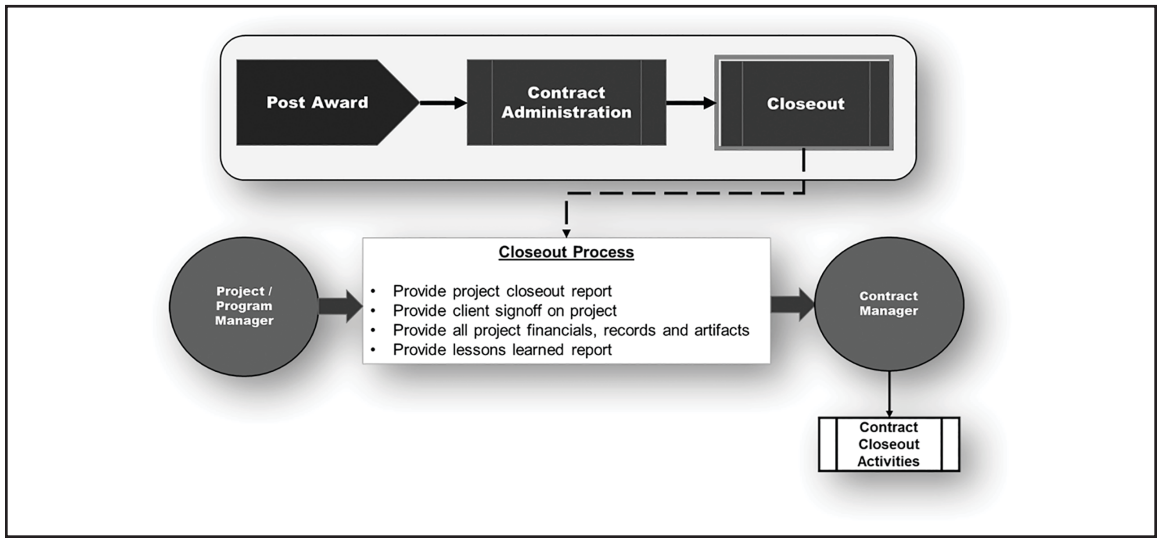



**FIGURE 4-41.** Causes of Contract Claims or Disputes and Failed Projects (CMS Group, Inc.)

| Causes of Contract Claims or Disputes | Causes of Project Failure |
|---|---|
| Scope and goals not clearly defined | Unclear scope requirements that lead to scope creep and unrecoverable costs |
| Responsibility of the parties not clearly defined | Failure to establish project governance (who and how the buyer and seller will communicate, make decisions, and work together) |
| Missed service levels and warranties | Failure to engage the people that will be doing the work when developing the contract and project requirements and estimates |
| Invoices / late payments | Failure to understand the organization's strategic goals and objectives and how the project helps achieve them |
| Failed delivery (deliverables)/acceptance | Quality issues with deliverables and performance due to vague definitions and lack of acceptance criteria |
| Payments are disputed | Underestimating the project's complexity and failure to plan accordingly |
| Ineffective change management process | Failure to identify all the stakeholders and their needs and requirements for the project |
| Insufficient project control | Lack of oversight throughout the contract management and project management processes for combined checks and balance and applicable influence for successful outcomes |
| Unmet performance/ guarantees | Lack of resources, staffing, or skills required in each phase of the project |
| Liquidated damages | Failure to manage internal stakeholders and customer expectations |
| Price/price changes | Unclear team roles and responsibilities (why the project is being done and how each will contribute to the project's objectives) |

administration process will determine the success of the project. As the contractor performs the project effort, contract administration activities will be used to monitor the contractor's achievement of the project's cost, schedule, and performance objectives. Based on data and knowledge obtained during contracting administration activities (such as monitoring and measuring contractor performance), the project manager can then take preventive actions (in anticipation of possible problems) or corrective actions (when variances from the project plan are identified) to control the project effort's pursuit of cost, schedule, and performance objectives. Thus, contract administration activities put the "teeth" in project monitoring and control. (Garrett and Rendon, *Contract Management* magazine, March 2010)

#### *B.4.3.12 Contract Closeout*

It is crucial to engage with the project manager to ensure the project is formally completed and closed out. Of importance in the contract closeout process is to ensure there are no outstanding deliverables or activities left. Project managers should provide contract managers with their project closeout reports; the official acceptance document(s) from the customer; and all the records, financials, and artifacts needed for retention (or audits). There should also be a lessons-learned input from the project manager. This is invaluable later when confronted with a similar contract and project. **FIGURE 4-40** presents the interface during the contract closeout.

### *B.4.4 Causes of Failed Projects and Contract Claims or Disputes*

Ambiguity, misinterpretation, and lack of communication can spell disaster for projects under contract. **FIGURE 4-41** provides examples of project performance issues that can directly relate to contract claims and disputes.

### *B.4.5 Project Management Key Terms and Definitions*

Following is a list of common terms, definitions, and acronyms used within the project management industry.

**Acceptance Criteria** – Those criteria, usually stated in a contract and/or SOW that includes deliverables, performance requirements and essential conditions, which must be met to complete project deliverables and be accepted.

**Agile** – A project management methodology utilizing short-term sprints to react to changing scope requirements.

**Baseline** – The original plan (for a project, a work package, or an activity) plus or minus approved changes. Usually used with a modifier (e.g., cost baseline, schedule baseline performance measurement baseline).

**Budget** – When unqualified, refers to an estimate of funds planned to cover a project or specified period of future time. When approved, the established estimate for the project, any work breakdown component, or any scheduled activity.

**Change Control** – The process of controlling, documenting, and storing the changes to control items. This includes proposing the change, evaluating, approving or rejecting, scheduling and tracking.

**Change Control Board (CCB)** – A formally constituted group of stakeholders responsible for approving or rejecting changes to the project baselines.

**Charter** – A document issued by the initiator of the project, usually the project sponsor that formally authorizes the existence of the project and provides the project manager with the authority to apply organizational resources to project activities.

**Constraint** – The state, quality, or sense of being restricted to a given course of action or interaction. An applicable restriction or limitation, either internal or external, to the project that will affect the performance of the project or a process.

**Contingency** – (1) Something that may happen: an event that might occur in the future, especially a problem, emergency, or expense that might arise unexpectedly and therefore must be prepared for, (2) A provision made against future unforeseen events.

**Deliverable** – Any measurable, tangible, verifiable outcome, result, or item that must be produced to complete a project or part of a project. Often used more narrowly about an external deliverable, which is a deliverable that is subject to approval by the project sponsor or customer.

**Earned Value** – A method for measuring project performance. It compares the amount of work that was planned with what was actually accomplished to determine if cost and schedule performance went as planned.

**Portfolio** – A collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet objectives.

**Portfolio Management** – The centralized management of one or more portfolios, which includes identifying, prioritizing, authorizing, managing, and controlling projects, programs, and other related work, to achieve specific strategic business objectives.

**Product** – General term used to define the end result of a project delivered to a customer.

**Product Description Statement** – A non-formal, high-level document that describes the characteristics of the product/process to be created.

**Program** – A group of related projects managed in a coordinated way. Programs usually include an element of ongoing activity.

**Project** – A temporary endeavor undertaken to create a unique product or service.

**Project Administration** – Entails making project plan modifications that may result from such things as: new estimates of work still to be done, changes in scope/functionality of end product(s), resource changes and unforeseen circumstances. It also involves monitoring the various Execution Phase activities, monitoring risks, status reporting, and reviewing/authorizing project changes as needed.

**Project Charter** – A document issued by senior management that provides the project manager with the authority to apply organizational resources to project activities.

**Project Controls** – Project controls are a set of processes used to understand and influence the amount of time or money spent on a project. Each project control focuses on a distinct part of the project plan, like the schedule, resources, or potential risks.

**Project Controller** – A project controller is a key member of the project team and works directly with the project manager to help define the project's goals and objectives; create and maintain a project's budget and schedule, analyze progress reported against the work schedules; and recommend actions to improve progress.

**Project Management** – The application of knowledge, skills, tools, and techniques to project activities in order to meet project requirements.

**Project Manager** – The individual appointed and given responsibility for management of the project.

**Project Plan** – A formal, approved document used to guide both project execution and project control. The primary uses of the Project Plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines.

**Scope** – The sum of the products and services to be provided as a project.

**Scope Change** – Any change to the project scope. A Scope Change almost always requires an adjustment to the project cost or schedule.

**Scope Creep** – The gradual addition of new requirements to the original product specifications.

**Sponsor** – The individual or group that provides the financial resources, in cash or in kind, for the project.

**Stakeholder** – Individuals and organizations who are involved in or may be affected by project activities.

**Start Date** – The day and sometimes the time associated with a schedule activity's start, usually qualified by one of the following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.

## B.5. Risk Management

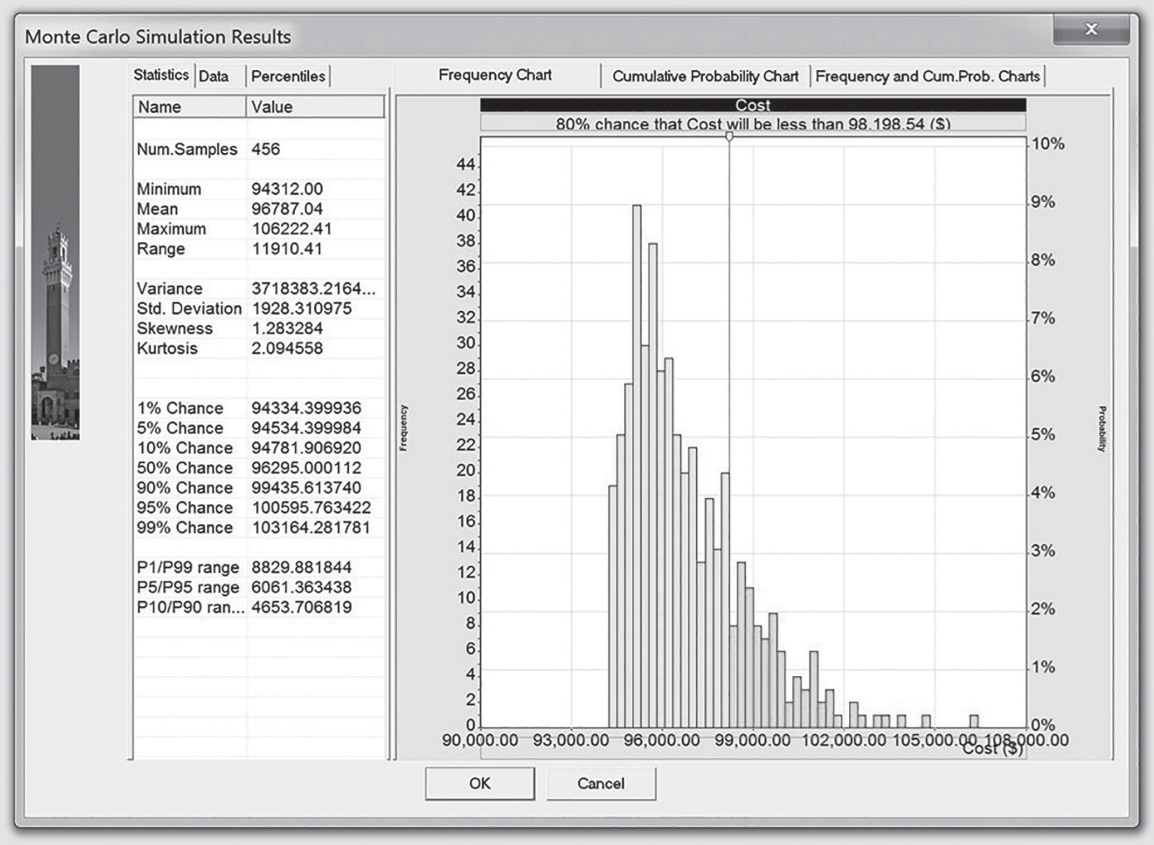
(From Gregory Garrett's book, *Risk Management for Complex U.S. Government Contracts and Projects*)

Contract management has evolved into a strategic role that interacts with internal and external stakeholders. Contract managers are placed on the frontline of being able to determine internal and external risks to contract management and project management. Understanding how to recognize risks and how to mitigate them is a crucial competency for contract managers.

### *B.5.1 Risk Management Overview*

Risk management is the ability to efficiently and cost effectively mitigate potential problems, and it is fundamental to good business in both the public and private sectors. As a result of evolving technologies, global outsourcing, increasing demands for improved services, and tremendous financial pressures, the complexity of contract management and project management have grown exponentially. Thus, it is vital for contract managers and their stakeholders to work together to mitigate the contractual, scheduling, technical, legal, and financial aspects of risk.

**FIGURE 4-42**. Sample Monte Carlo Simulation Graph (image credit to Intaver Institute Risky Project Software)




### *B.5.1.1 Risk Management Terms*

"Opportunity" is the measure of the probability of an event (a positive desired change) occurring and the desired impact of that event.

The definitions of "uncertainty" and "risk" described here were derived from the article, "Uncertain Estimating Methods and Techniques for Controlling the Uncertainty in Your Estimates," by Don Shannon in the October 2018 issue of *Contract Management* magazine.

> "Uncertainty" is a lack of knowledge concerning the outcome of an event. The uncertainty can be caused by either of two causes:
>
> - *Epistemic* (a lack of knowledge that can be remedied by additional data gathering, research, or experimentation) and
> - *Aleatory* where the outcome is random (variability or a roll of the dice).
>
> "Risk" is an event that may or may not occur (i.e., probabilistic) that is comprised of three elements:
>
> - *Polarity* positive (i.e., desired events resulting in an opportunity) vs. negative (unwanted events that disrupt performance),
> - *Likelihood* of occurrence, and
> - *Outcome* (which again may be variable).

### *B.5.1.2 Uncertainty in Risk Management*

Consequently, risks are a double uncertainty—the first being will it occur and the second being the magnitude or impact of the outcome. Uncertainty is evaluated by using a range of values to represent the likely outcomes in cost or schedule analyses. Risks are evaluated by a two-step process. First, we consider will the risk occur and then we consider the impact. This is achieved using quantitative risk analysis methods—the most popular of which is a simulation and the results are represented graphically. (See **FIGURE 4-42**)

The utility of this approach is it allows selection of a value that is consistent with the risk appetite of the organization. Currently 80% certainty is the benchmark used by DoD and Congress for reporting likely program costs.

This "Uncertainty in Risk Management" section was derived from the article, "Uncertain Estimating Methods and Techniques for Controlling the Uncertainty in Your Estimates," by Don Shannon in the October 2018 issue of *Contract Management* magazine.

#### *B.5.1.3 Risk-Mitigation Elements and Practices*

To reduce business risks and optimize performance results in the marketplace, buyers and sellers should develop a comprehensive or holistic approach to risk management. A comprehensive approach to risk management should appropriately address the "4 Ps" of success: *people, processes, performance*, and *price*. See **FIGURE 4-43** the associated risk-mitigation elements and practices.

#### *B.5.1.4 Opportunity and Risk Management (ORM)*

The primary goal of opportunity and risk management (ORM) is to continually seek ways to maximize

**FIGURE 4-43.** Risk Management Best Practices

| 4 Ps | Risk-Mitigation Elements and Practices |
|---|---|
| **People** | • Select highly qualified, competent, and certified professionals.<br>• Provide appropriate individual, team, and organizational performance standards, metrics, and incentives.<br>• Provide timely professional continuing education, cross-functional education and experience, and on-the-job training in risk management.<br>• Provide timely and appropriate performance feedback.<br>• Develop realistic requirements and delivery schedules.<br>• Develop and implement an effective mentor/coaching program.<br>• Ensure effective training in risk management processes and tools are provided.<br>• Create and consistently practice a "tone at the top" message of the need and value of life cycle risk management.<br>• Use expert consultants as needed—seek advice. |
| **Processes** | • Develop an integrated life cycle risk management process that appropriately addresses all functional areas of the organization of each contract from beginning to end.<br>• Incorporate knowledge management tools to ensure knowledge is captured, shared, and reused before, during, and after work is performed throughout the contract/project life cycle.<br>• Practice disciplined systems engineering and project management.<br>• Implement an effective earned value management system (EVMS).<br>• Use multiyear procurement (MYP) and multiyear funding (MYF) to ensure stable funding.<br>• Develop and use an effective cost estimating and accounting system.<br>• Ensure risk identification tools and techniques are developed and appropriately implemented.<br>• Develop an appropriate governance structure.<br>• Provide effective processes and tools to assess the probability and financial impacts of potential risks (technical, schedule, and contract).<br>• Allocate funds for appropriate risk-mitigation planning and actions. |
| **Performance** | • Terminate all or part of poor performance projects as soon as possible.<br>• Remove poor individual performers if they are not adding value to the team and project.<br>• Remedy or terminate poorly performing subcontractors.<br>• Manage contract changes.<br>• Create a performance-based culture within your team and organization.<br>• Communicate your organization's and team's vision, mission, and performance goals.<br>• Develop performance-based contracts with your clients and suppliers.<br>• Create an effective ethics and compliance internal control system.<br>• Practice risk management using a life cycle risk management process.<br>• Ensure regulatory and contract (FAR, CAS, SOX, etc.) compliance. |
| **Price** | • Select appropriate pricing arrangements given the risk vs. reward opportunity.<br>• Ensure life cycle costs are properly included in the budget and contract funding.<br>• Create a management reserve in the project budget.<br>• Avoid buy-in situations.<br>• Price and negotiate contract changes appropriately.<br>• Select and tailor contract terms and conditions to properly address items not priced into the contract.<br>• Use appropriate cost estimating methods and techniques.<br>• Conduct price analysis and/or cost analysis.<br>• Obtain independent cost estimates.<br>• Hire cost/pricing experts, either internally or through consultants. |

opportunities and to mitigate risks. ORM is an iterative process approach to managing those opportunities and risks that may occur during the course of business that could affect the success or failure of the project. Once identified, the probability of each each even occurring and its potential effect on the project are analyzed, prioritized, and ranked from highest to lowest. Beginning with the highest prioritized events and working down, the project management team determines what options or strategies are available and chooses the best strategy to maximize opportunities and reduce or prevent the identified risks from occurring. This information is the basis for the ORM plan, which should be continually referred to and updated during the project life cycle.

The ORM Six-Step Model (see **FIGURE 4-44**) is an ongoing process model with two major components: (1) opportunity/risk assessment and (2) opportunity/risk action plans.

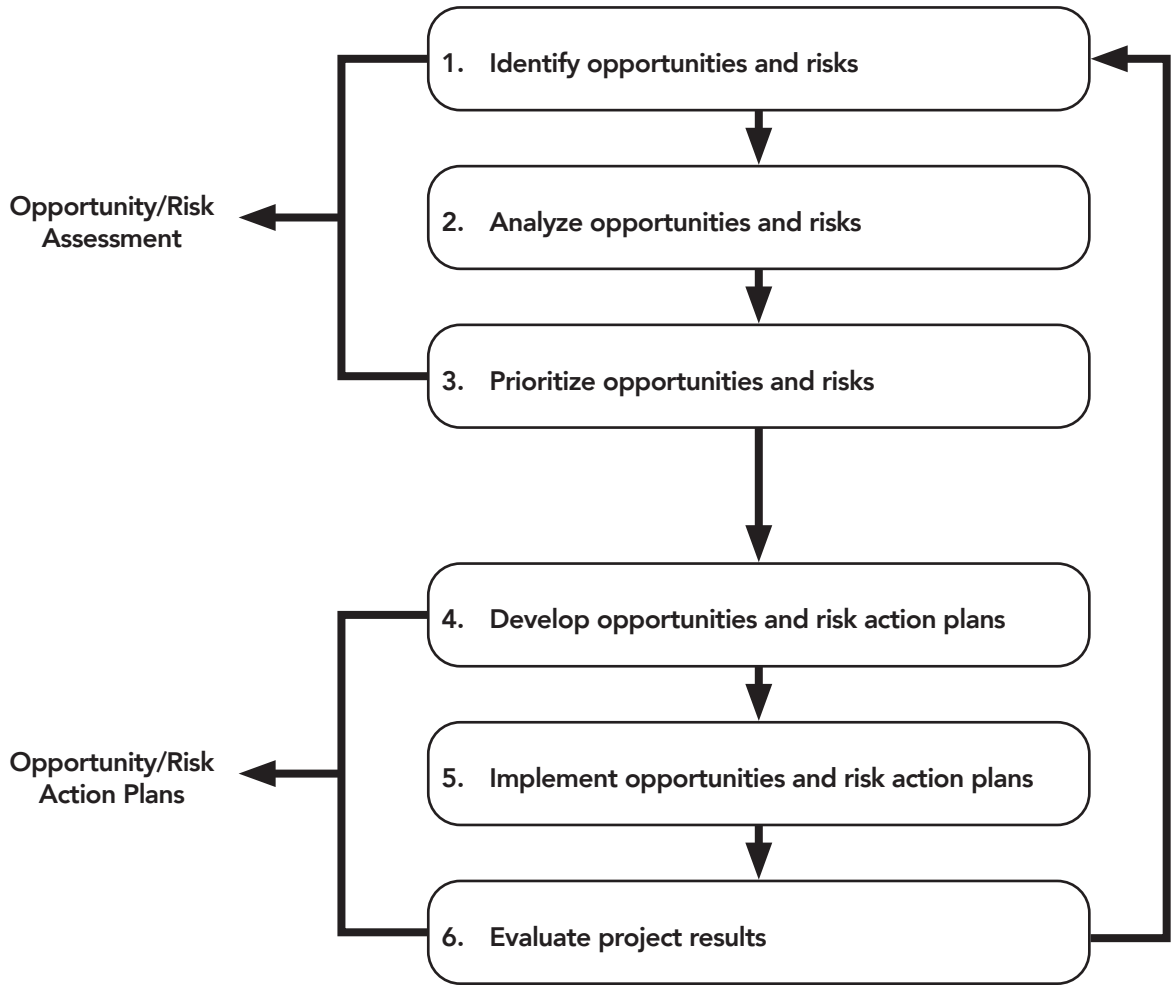
Opportunity/risk assessment is composed of three steps:

1. Identify opportunities and risks,
2. Analyze them, and
3. Prioritize them.

Opportunity/risk action plans is also composed of three steps:

1. Develop opportunity and risk action plans and strategies,
2. Implement opportunity and risk action plans and strategies into the project management plan, and
3. Evaluate project results.

**FIGURE 4-44**. The Opportunity and Risk Management Six-Step Model (Garrett 2009)



#### *B.5.1.5 Knowledge Management in Assessing Risk*

Knowledge management is essential to risk management. A great deal of knowledge (information and experience) is used and reused each time an individual or team executes a contract management project. It is important that this knowledge is not only leveraged in each project but is further developed in a consistent and disciplined manner that captures, adapts, transfers, and reuses what has been learned.

The following are recommended knowledge management tools to utilize before, during, and after a project.

*B.5.1.5.1 Learning Before (Peer Assists)*

"Learning before doing" targets a specific challenge, imports knowledge from people outside the team, identifies possible approaches and new lines of inquiry, and promotes sharing of learning through a facilitated meeting.

*B.5.1.5.2 Learning During (Action Reviews)*

"Learning while doing" is a process that focuses people by having them answer four questions immediately after an activity or event:

1. What was supposed to happen?
2. What actually happened?
3. If these two answers are different, why are they different? and
4. What can we learn and immediately apply?

An added benefit is that, if done well and if people answer honestly, trust builds within the team.

*B.5.1.5.3 Learning After (Retrospects)*

"Learning after doing" is supported by a facilitated process. Conducted immediately after the end of the project or the project phase, a retrospect encourages team members to look back at the project to discover what went well and why, and what could have been done differently, with a view toward helping a different team repeat successes and avoid pitfalls.

### *B.5.2 Sources of Risk in Contract Management*

#### *B.5.2.1 Risk Management Framework in Contract Management*

The process of building a risk management framework for contract management can be summarized as follows (Esperne 2010):

*Competency.* Learning risk management principles and practices.

*Translation.* This is applying risk management to the contract management function, in particular the processes and legal and business purposes of contracts. It is the practicing of risk management throughout the contract life cycle, and the execution of risk management plans through the enforcement of contract terms and management of contractual relationships, to achieve organizational mission, goals, and objectives.

*Establishment.* This is implementing risk management in contract management across the organization and at all levels (i.e., corporate governance including budgeting, strategic business planning, internal policies to include ethics and corporate social responsibility, acquisition regulations, and staff and line management processes. Establishment can take place within an enterprise risk management program.

*Action.* This is exploiting opportunities in the contract life cycle for implementing risk management, within constraints.

*Audit and reassessment.* Success or failure in risk management depends on whether the actual occurrence of treated risks has negatively impacted desired contractual outcomes beyond expectations. Risk registers and other monitoring tools generate data that can be used to adjust risk management plans and strategies.

*Extension.* This is establishing risk management as an external-facing policy and as an accepted way of doing business under contract with third parties. While risk management in contract management can be actioned unilaterally, mutual acceptance of risk management can open new dimensions to contract management.

#### *B.5.2.2 Sources of Uncertainty and Risk in Contract Management*

Uncertainty and risk in contract management arise from five main sources:

1. Lack of buyer understanding of requirements,
2. Shortcomings of language and differing interpretations,
3. Behavior of the parties,
4. Haste, and
5. Deception.

*B.5.2.2.1 Lack of Buyer Understanding of Requirements*

If the buyer does not have a clear understanding of its requirements or cannot express that understanding effectively in terms of specific deliverables or level of effort, an agreement cannot be reached with the seller to fulfill those requirements.

Many buyers have only a vague notion of their requirements, as revealed in the language of their specifications or statements of work (SOW). Broad, ambiguous expressions that obligate a seller to do something "as required" or "as necessary" are often used because the buyer does not know its needs but wants to put the seller in the position of having to do whatever it is whenever the buyer figures it out. Ironically, some buyers overcompensate by specifying their needs down to the smallest detail.

*B.5.2.2.2 Shortcomings of Language and Differing Interpretations*

A party to a contract may mean one thing but say another. Inability to express ideas clearly may result in a contract document that does not accurately reflect the intended agreement. Unfortunately, these scenarios are all too common in contract management.

*B.5.2.2.3 Behavior of the Parties*

The actions of one or both parties after the contract is signed may give meaning to the words of the contract that the parties did not originally intend. For example, the seller may choose not to enforce a late payment penalty clause when an important buyer consistently pays late. Thus, the seller establishes a precedence of performance, or lack thereof, which is inconsistent with the language in the contract.

*B.5.2.2.4 Haste*

In business, haste causes many problems. Because of impatience with the bureaucratic contracting process, stakeholders often promote haste in contract formation. In the rush to "get on contract," many ideas are not fully developed or discussed by the parties. As a result, the expectations of both parties may never be fully understood—by themselves or each other.

Unrealistic expectations go unchallenged. Realistic expectations go uncommunicated. These expectations do not disappear, however, and will rise to haunt both contract managers and project managers after the project is under way.

*B.5.2.2.5 Deception*

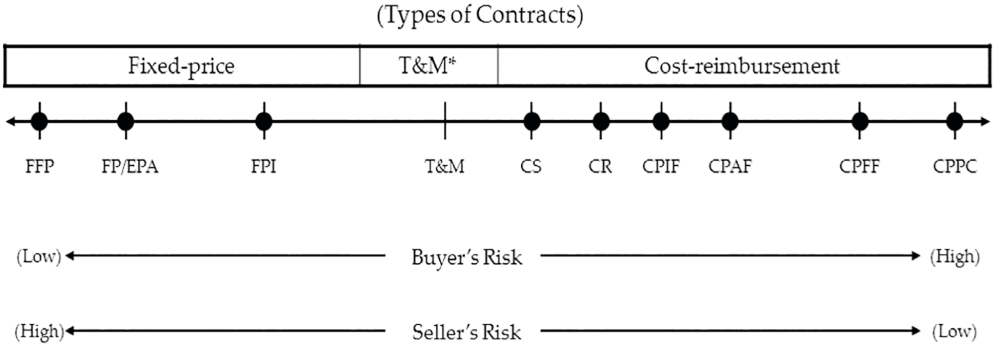
Deception, with both ill and benign intent, is a reality of the business world—thus the warning caveat emptor, or "let the buyer beware." Deception is a deliberate defect in the communication process. As previously discussed, buyers often do not fully understand the nature of the goods and services they buy, the methods of the industry producing them, or the practices of the market selling them.

***B.5.2.3 Risk Management through Contract Terms and Conditions***

Collectively, clauses form the terms and conditions (T&C) of the contract, and they define the rights and responsibilities of the parties to the contractual agreement. If called upon to enforce the contract in arbitration or a lawsuit, the arbitrator or court will look to these T&C in resolving the dispute.

- A *term* is simply a part of the contract that addresses a specific subject. In most contracts, terms address payment, delivery, product qual-

**FIGURE 4-45**. Range of Contract Types and Risk (Garrett 2009)




*T&M contracts typically involve higher levels of risk for buyers.

ity, warranty of goods or services, termination of the agreement, resolution of disputes, and other subjects. Terms are described in clauses. The Governing Law clause is a contract term.

- A *condition* is a phrase that either activates or suspends a term. A condition that activates a term is called a condition precedent; one that suspends a term is called a condition subsequent.

An example would be payment terms. When the deliverable is accepted by the buyer, then the condition is such that payment terms are *activated*, and the buyer is obligated to pay the seller. However, if the deliverable is not accepted by the buyer, the payment terms are *suspended* until the condition is cleared by the seller.

A common misunderstanding is that price is separate and distinct from the T&C, but that is not so. Nearly all T&C affect price, either increasing or decreasing costs or liabilities to the parties. In world-class companies, senior management ensures that all contract managers and stakeholders are aware of and fully understand the cost, risk, and value of T&C and how they affect price.

#### *B.5.2.4 Risk Sharing through Contract Types*

**FIGURE 4-45** provides a range of contract types keyed to performance measurement and risk. For detailed information, see 4.1.2 Contract Types.

### *B.5.3 Sources of Risk in Project Management*

#### *B.5.3.1 Risk Areas, Definitions, and Examples*

**FIGURE 4-46** presents examples of specified areas of potential risks in project management.

### *B.5.4 Risk Management: Common Myths and Best Practices*

**FIGURE 4-46**. Examples of Specified Areas of Potential Risks in Project Management

| Risk Area | Definition | Significant Risks |
|---|---|---|
| Budget | Sensitivity of project to budget changes and reductions. | • Budget practices (releasing funds, quarterly or monthly) negatively affect long-term planning processes.<br>• Budget changes or reduction can negate contractual arrangements and continuity of operations. |
| Business | Risk that an investment will fail to achieve the expectations of the project's stakeholders. | • Investment's statements of support of customers not carried through in project outcomes.<br>• Investment planning has little or no customer involvement. |
| Cost | Ability of system to achieve life cycle support objectives; includes effects on budgets, affordability, and effects of errors in cost estimating techniques. | • Realistic cost objectives not established early.<br>• Excessive life cycle costs due to inadequate treatment of support requirements.<br>• Significant reliance on software. |
| Data/ Information | Risk associated with data/ information loss or disruptions caused by natural disasters or by area-wide disruptions of communication or electric power or malicious acts; can also include the ability of the investment to obtain and manipulate data as planned. | • No contingency plans exist to deal with the loss/misuse of data or information.<br>• Project may not be able to access data from other sources. |
| Logistics | Ability of the system configuration and documentation to achieve logistic objectives. | • Inadequate supportability late in development or after fielding, resulting in need for engineering changes, increased costs, or schedule delays.<br>• Life cycle costs not accurate because of poor logistics supportability analyses.<br>• Logistics analyses results not included in cost-performance trade-offs.<br>• Design trade studies do not include supportability considerations. |
| Management | Degree to which project plans and strategies exist and are realistic and consistent. | • Subordinate strategies and plans are not developed in a timely manner or based on the acquisition strategy.<br>• Proper mix (experience, skills, stability) of people not assigned to the project.<br>• Effective risk assessments not performed or results not understood and acted upon. |

| | | |
|---|---|---|
| Organizational and Change Management | Risk that the following types of activities will not be successful: 1) defining and instilling new values, norms, attitudes, and behaviors within an organization that support new ways of doing work and overcome resistance to change; 2) building consensus among customers designed to better meet their needs; and 3) planning, testing, and implementing all aspects of the transition from one organizational structure or business process to another. | • Organizational cultural resistance to proposed process change may be high.<br>• Extensive employee training may be required to apply benefits of investment to the proposed process.<br>• Initial operation of the new system demonstrates lack of use, improper use, or failure to properly use due to unchanged organizational structure or process. |
| Overall Risk of Project Failure | Risk that there is an inherent project weakness, such as the project missing a clear link between it and the organization's key strategic priorities, including agreed-to measures of success. | • Users of the project's deliverables may desire a different solution.<br>• Investment solution may be transferred to another activity in a reorganization. |
| Privacy | The risk of possible violations of the legal restrictions on the collection, use, maintenance, and release of information about individuals. | • Investment may feature a publicly accessible website with personal data links.<br>• Investment may involve a process that collects, manipulates, stores, or shares personally identifiable information.<br>• Investment may convert paper files to electronic files. |
| Project Resources | The risk that assets available or anticipated (e.g., people, funding, equipment, and facilities) used to plan, implement, and maintain the project will be insufficient. | • The scope of the investment is not clear.<br>• Necessary project resources are not clearly or completely specified.<br>• No examples of a successful approach to solving the problem are provided in either the project description or in discussion of alternatives. |
| Requirements | Sensitivity to uncertainty in the system description and requirements. | • Operational requirements vaguely stated or not properly established.<br>• Requirements not stable.<br>• Required operating environment not described.<br>• Requirements too constrictive—identify specific solutions that force high cost. |
| Schedule | The risk of sufficiency of time allocated for performing the defined acquisition tasks. | • Schedule not considered in trade-off studies.<br>• Schedule does not reflect realistic acquisition planning.<br>• Acquisition project baseline schedule objectives not realistic and attainable.<br>• Resources not available to meet schedule. |
| Strategic | The risk of misalignment with organizational vision, mission, and strategic goals. | • The investment fails to achieve the strategic goals it states it will support.<br>• Project objectives are not clearly linked to the organization's overall strategies, policies, and standards. |
| Technology | The risk that key technologies used in the project will lose value because a new, more functional product or technology has superseded the project's, or when the project's products become less useful or useless before the project has completed its full functional life cycle. | • Immaturity of commercially available technologies.<br>• Strategies for avoiding the use of outdated technical resources over the system life cycle have not been incorporated into the project plan.<br>• There is no plan for regular technology upgrades or refreshes.<br>• Final product will be overly expensive, delivered late, or otherwise unacceptable to the customer. |
| Threat | Sensitivity to uncertainty of threat description. | • Uncertainty in threat accuracy.<br>• Sensitivity of design and technology to threat.<br>• Vulnerability of system to threat and threat countermeasures.<br>• Vulnerability of project to intelligence penetration. |

**Myth 1:** Risk management is well defined, cost-effectively practiced, and successfully implemented by most sellers.

**Reality:** Most sellers do not have a comprehensive or life cycle risk management methodology for their business. Risk management is often fragmented by functional areas (financial, contracts, engineering, manufacturing, professional services, supply-chain management, etc.)

Some sellers do take the time to conduct a risk identification and assessment as part of their bid/no-bid process. While aggressive sellers submit offers on nearly every solicitation, not knowing if they can actually perform the contract.

Risk-mitigation planning and cost-effective implementation is not consistently practiced by many sellers.

Finally, prime contractors often do not efficiently or cost-effectively flow down appropriate clauses to their respective subcontractors, which can result in late deliveries, higher costs, reduced profits, and upset buyers.

**Myth 2:** The use of a firm-fixed-price (FFP) contract places all risk on the sellers.

**Reality:** The buyer also shares in the risk associated with FFP pricing arrangements. The buyer has the risk that the selected seller may not adequately perform the work, thus requiring a remedy for the seller's failure to deliver (i.e., withholding of payment, liquidated damages, termination for default, etc.)

The buyer also has the risk of unclear definition or specification of the requirements and deliverables. It is entirely possible for a seller to perform the work as required and specified by the buyer, yet the buyer still does not get what it really needs or wants because of the buyer's inadequate statement of requirements and outcomes/deliverables.

**Myth 3:** The creation of a performance-based contract (PBC) will reduce risks and ensure the buyer obtains successful contract/project results.

**Reality:** Unfortunately, many buyers do not properly create performance-based contracts, often resulting in higher risks and poor-to-mediocre performance results. For example, many buyers suffer from the following challenges:

- Incomplete or inadequate performance work statements (PWSs) or statements of objectives (SOOs);
- Use of an overly detailed and highly prescriptive statement of work (SOW);
- Insufficient quality assurance surveillance plans;
- Poor selection of performance standards and metrics to drive sellers to high-performance results;
- Inappropriate contract incentive plans, or failure to properly administer and reward superior results or apply penalties for poor performance; or
- Inadequate post-award contract administration support due to shortage of resources, inadequate training, and poor quality control.

**Myth 4:** The use of owner-furnished property will always reduce the cost and risk of the contract/project.

**Reality:** Sometimes owner-furnished property does reduce the cost and risk of the contract or project, but many times it does not. In fact, there are times when the owner-furnished property seems to cause more problems than it solves when it is delivered late, damaged, or defective.

**Myth 5:** All risk factors can be identified, quantified, and mitigated.

**Reality:** If a buyer or seller develops and practices risk management as an integrated aspect of their business activities, and uses knowledge management throughout the project life cycle, then most risk factors can be identified, quantified, and mitigated. However, many organizations do not practice risk management as an integrated aspect of their business activities. Plus, most organizations have not fully embraced the power of capturing, sharing, and reusing knowledge to enhance risk management. Buyers and sellers need to ensure they have developed and implemented knowledge-based tools to capture knowledge—before, during, and after the performance of the work, not just after completion of the project.

**Myth 6:** The longer and more detailed the buyer's solicitation planning and source selection process, the more likely it will reduce risk and obtain high-performance outcomes from the seller.

**Reality:** It is not the quantity of people or total time spent; rather, it is the quality of the people and their

respective knowledge, experience, dedication, and executive-level commitment that typically determines whether a buyer's acquisition planning yields high-performance outcomes from the selected sellers.

**Myth 7:** The more competitors in a procurement, the better the competition.

**Reality:** Again, the quantity of sellers does not necessarily directly relate to the quality of the competition. Sometimes, there may be only one or two high-quality sellers of the needed products, services, or solutions. Thus, seeking three or more offers may result in higher acquisition costs due to a longer evaluation process and related source selection activities.

**Myth 8:** All sellers are crooks.

**Reality:** While government buyers must provide stewardship over public funds and industry buyers must contain company expenses, sellers must protect their revenue streams and generate profits. Most sellers are honest, reliable, and dedicated. They are focused on supporting buyers in achieving their respective mission requirements while meeting their stakeholders' objectives. Unfortunately, there is a relatively small percentage of sellers who do act illegally and unethically, and their bad actions are frequently publicized by the media and Congress, creating a very negative perception of the industry.

**Myth 9:** Project management and contract administration are less important to risk management than acquisition strategic planning and source selection.

**Reality:** Project management and contract administration are in fact just as important, if not more so, to risk management than the acquisition strategic planning and source selection. Said simply, it is good to have an effective plan and a qualified contractor, but it is better to ensure project execution of the plan and contractor delivery of the promised results. Too often, both buyers and sellers are in such a hurry to get the contract awarded, they focus nearly all their resources on the pre-award and award activities and too few resources on contract performance.

**Myth 10:** Past Experience = Successful Performance.

**Reality:** Solely because a seller has experience in providing a product, service, or solution in the past does not necessarily mean that same seller will be successful in delivering a similar product, service, or solution in the future. In fact, if the seller has a track record of poor performance in their past experiences, then it is quite likely they will have challenges in achieving successful performance outcomes in the future. Clearly, the lowest risk scenario is to find a seller with extensive experience, expertise, and demonstrated high-performance results on delivery of similar products, services, and solutions.

## B.6. Supply Chain Management

(By Jim Kirlin)

### *B.6.1 Purpose*

The purpose of this section is to briefly discuss the essentials of supply chain management. The focus is on what a contract manager should know about supply chain management.

### *B.6.2 Supply Chain*

#### *B.6.2.1 Definition of Supply Chain*

The Institute for Supply Management (ISM) defines *supply chain* as "[t]he network of organizations that extend downstream to customers' customers' customers and upstream to suppliers' suppliers' suppliers."[1]

#### *B.6.2.2 Basic Functions of a Supply Chain Operation*

The Supply Chain Council uses a "Supply Chain Operations Reference" (SCOR) model to show the basic functions of a supply chain operation, with three basic functions being "Source," "Make," and "Deliver."[2] Using this model, these three basic functions of a company's organization are linked to both the customer's organization and the company's suppliers, as shown below in **FIGURE 4-47**.

Note how a supplier's delivery function is linked to a company's sourcing function—and, in turn, how your company delivers to the customer's sourcing function. It is this very linkage that forms the "chain" of supply. This relationship is illustrated in **FIGURE 4-48**

### *B.6.3 Supply Management*

#### *B.6.3.1 Definition of Supply Management*

ISM expands the concept of the "source" function mentioned in the SCOR model, with the definition of supply management, which is "the identification, acquisition, access, positioning and management of resources and related capabilities the organization needs or potentially needs in the attainment of its strategic objectives."[3] In this definition, supply management is quite broad.

**FIGURE 4-47.** Supply Chain Operations Reference (SCOR) Model


**FIGURE 4-48.** The Chain of Supply


#### *B.6.3.2 Responsibilities of Supply Management*

The broad responsibilities of supply management include these seven items:[4]

1. Provide an uninterrupted flow of materials and services to the operating system,
2. Keep inventory investment to a minimum,
3. Maximize quality,
4. Find and develop competent sources of supply internationally,
5. Standardize requirements for products and services,
6. Purchase materials and services at the lowest Total Cost of Ownership, and
7. Foster cross-functional relationships.

#### *B.6.3.3 Components of Supply Management*

ISM states that the components of supply management are:[5]

- Disposition/investment recovery,
- Distribution,
- Inventory control,
- Logistics,
- Manufacturing supervision,
- Materials management,
- Packaging,
- Product/service development,
- Purchasing/procurement,
- Quality,
- Receiving,
- Strategic sourcing,
- Transportation/traffic/shipping, and
- Warehousing.

Notice that "purchasing/procurement" is just one component of supply management. Therefore, "supply chain management" or "supply management" does not equal "purchasing/procurement." "Purchasing/procurement" is discussed in 2.6.5 of this section, and in section 4.9, Subcontract Management. The rest of this section discusses the other components of supply management that are shown above.

#### *B.6.3.3.1 Disposition/Investment Recovery*

Disposition is the act of moving goods out of one's internal organization to another organization due to loss of value, obsolescence, excess inventory or product change.[6] Investment recovery is a systematic, centralized organizational effort to manage the surplus/obsolete equipment/material and scrap recovery/marketing/disposition activities in a manner that recovers as much of the original capital investment as possible.[7]

#### *B.6.3.3.2 Distribution*

Distribution is the process by which commodities move to final customers, including return of goods. Activities include storing, transacting, packaging and shipping.[8]

#### *B.6.3.3.3 Inventory Control*

Inventory control is the management of inventories, including: decisions about which items to stock at each location; how much stock to keep on hand at various levels of operation; when to buy; how much to buy; controlling pilferage and damage; and managing shortages and back orders.[9]

#### *B.6.3.3.4 Logistics*

Logistics is the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.[10]

#### *B.6.3.3.5 Manufacturing Supervision*

Manufacturing is planning, managing and performing the processing of materials into intermediate or final products, usually in large quantities.[11]

#### *B.6.3.3.6 Materials Management*

Materials management involves the planning, acquisition, flow and distribution of production materials from the raw state to the finished product state.[12]

#### *B.6.3.3.7 Packaging*

Packaging serves a number of functions, including containment, protection, apportionment, unitization, convenience and communication.[13]

#### *B.6.3.3.8 Product/Service Development*

Product development is a series of integrated processes in new product development chronicling steps from idea conception to commercialization.[14]

#### *B.6.3.3.9 Quality*

There are many definitions of quality. Regarding supply management, quality aspects may involve the following:

- A supplier certification program which includes screening. There are many categories of screening and many names of categories. Examples include approved, certified and prequalified.
- Requiring suppliers to meet industry, worldwide or third-party registrations or certifications. Examples are the standards from the International Standards Organization (ISO).
- Establishing criteria for and accomplishing acceptance testing of supplier's products and services.
- Measuring and improving supplier performance.

#### *B.6.3.3.10 Receiving*

Receiving is the business function that is responsible for verifying that the goods received are the goods that the organization ordered. This involves inspecting and accepting incoming shipments.[15]

#### *B.6.3.3.11 Strategic Sourcing*

Strategic sourcing is the selection and management of suppliers with a focus on achieving the long-term goals of a business.[16] See B.6.5.3, Portfolio Analysis, later in this chapter where "strategic" is one segment of spend or sources.

#### *B.6.3.3.12 Transportation/Traffic/Shipping*

Traffic management is the management of activities associated with buying and controlling transportation services for a shipper or consignee or both.[17]

#### *B.6.3.3.13 Warehousing*

Warehousing is the storage and movement of internal materials and finished products.

### *B.6.4 Supply Management Organizational Structures*

There are many ways to organize the supply management function. Each model has its advantages and disadvantages. The organizational structure will be influenced by the portfolio analysis discussed further below. ISM identifies these three common organizational models[18] (see **FIGURE 4-49**).

### *B.6.5 Key Supply Chain Concepts Related to Purchasing/Procurement*

#### *B.6.5.1 Spend Analysis*

Spend analysis is analysis of the historical spending patterns in an organization, usually by commodity or category.[19]

#### *B.6.5.2 Pareto Analysis*

Pareto analysis (also known as ABC analysis or 80:20 rule) can be used to categorize purchases according to dollar value.[20] For example, 20 percent of the total number of items bought may account for 80 percent of the total value of the purchasing. The total spend can also be divided into three categories as shown in **FIGURE 4-50**.

**FIGURE 4-49**. Supply Management Organizational Structures

| Centralized | Hybrid | Decentralized |
|---|---|---|
| Authority and responsibility for most supply management-related functions are assigned to a central organization | Authority and responsibility are shared between a central supply management organization and business units, divisions or operating plants | Authority and responsibility for supply management-related functions are dispersed throughout the organization |

**FIGURE 4-50**. Pareto Analysis Categories

| Category | Description |
|---|---|
| A | High dollar, critical item |
| B | Medium dollar value, medium risk |
| C | Low dollar, low risk |

**FIGURE 4-51**. Portfolio Analysis: Kraljic Matrix

| | | |
|---|---|---|
| **High** | **Value** | |
| **Risk to Acquire** | **Bottleneck** | **Strategic** |
| | **Noncritical** | **Leverage** |
| **Low** | | **High** |

**FIGURE 4-52**. Risk Continuum

| Criteria | Lower Risk | Higher Risk |
|---|---|---|
| Type of goods or services | Standard | Unique |
| Availability of goods or services | Ready supply | Custom or made to order |
| Number of subcontractors | Multiple | Single, sole or limited |
| Production runs | High volume | Low volume |
| Lead times | Short | Long |
| Prices | Competitive | Unique market pricing |

**FIGURE 4-53**. Supplier Selection Criteria

| Criteria | Key Considerations |
|---|---|
| Responsibility | Compliance with law and regulations |
| Past performance | On-time delivery, quality product, affordable price |
| Technical capability | Facilities, equipment, skills |
| Financial | Stable financial condition |
| Price | Best value |
| Diversity status | Large business or certified in a designated diversity category |

#### *B.6.5.3 Portfolio Analysis*

Portfolio analysis is an approach that assigns risk levels to value levels to further refine the categories.[21] A Kraljic Matrix is a four-box matrix that reflects the segmentation of spend based on an assessment of the value of the spend relative to the market risk to acquire.[22] A streamlined example is shown in **FIGURE 4-51**.

Another approach is to show risk by certain criteria. A streamlined example is shown in **FIGURE 4-52**.

#### *B.6.5.4 Supplier Selection*

The criteria for selecting suppliers should generally include at least the criteria shown in **FIGURE 4-53**.

#### *B.6.5.5 Diverse Suppliers*

The impetus behind supplier diversity programs includes:

- Government legislation,
- Social responsiveness,
- Development of alternate sources of supply,
- Need to increase market share, and
- Need to meet the demands of customers.[23]

#### *B.6.5.6 Supply Base Rationalization or Optimization*

Supply base rationalization is determining and maintaining the appropriate number of suppliers by category/item depending on the risk and value of the item/category.[24] This is also called supply base optimization. The benefits of an optimized supply base include:

- The opportunity to work with best-in-class suppliers, which leads to improved value-chain performance;
- Lower transaction costs—the use of many suppliers increases overhead costs;
- Leverage leading to lower purchase costs;
- The ability to pursue value-added activities; and
- Reduced supply base risk.

#### *B.6.5.7 Supplier Relationships*

The supply chain management organization must also decide what kind of relationship to establish with each supplier. There are a variety of relationships that can be established. A general supplier relationship model is shown in **FIGURE 4-54**.[26]

**FIGURE 4-54**. Supplier Relationship Model

| Transactional | Collaborative | Strategic Alliance |
|---|---|---|
| Suppliers used for standard supplies. Price is the main factor. Least important strategically. | Less important on a strategic level and are less volume- or dollar-intensive. | Implies a long-term commitment and strategically are the most important relationships because the suppliers involved are of the highest business importance. |

#### *B.6.5.8 Supplier Relationship Management*

Supplier Relationship Management (SRM) is a methodology to structure and support relationships with suppliers that will assist in:

- Reducing procurement and excess inventory costs,
- Supporting a customer-focused business that delivers product/service customization and quality in the desired time frame, and
- Improving processes in an ongoing manner.[27]

#### *B.6.6 Supply Chain Management in Industry*

> "Purchasing and supply chain management today realize the importance of managing the best suppliers . . .. Supplier development, supplier design involvement, the use of full-service suppliers, total cost supplier selection, supplier relationship management, strategic cost management, enterprise-wide systems (enterprise resource planning or ERP) hosted on 'cloud' and integrated Internet linkages, and databases available 24/7 are now seen as ways to create new value within the supply chain."[28]

The risks proliferate with the number of devices connected to a company's network and interconnection increases with deeper collaboration with suppliers. Smaller suppliers usually are at greater risk, lacking funds to upgrade security, and pose a risk to their larger customers.

The pandemic also prompted renewed attention to contract terms and conditions to ensure *force majeure* clauses are present and to ensure all amendments, variations, and other actions and decisions are recorded and not just in email or oral agreements. Companies are finding, however, that strong supplier relationships built over time trump even the most tightly written contracts, reinforcing the need for powerful supplier relationship management.

#### *B.6.7 Supply Chain Management in Government*

Many government organizations began thoroughly mapping and intervening in their supply networks and those of their suppliers after the COVID-19 pandemic hit. The outbreak caused companies throughout supply networks to temporarily halt operations on government orders, fail to fulfill orders due to overwhelming demand, or contemplate or suffer permanent closure as orders dwindled, local governments issued shut-in orders, or essential staff fell ill or died.

Federal agencies used flexibility authorized by the federal acquisition system to:

- Extend performance dates,
- Employ simplified acquisition procedures for a larger number of transactions,
- Increase the size of monthly progress payments,
- Expedite contract payments, and
- Accelerate contract awards.

#### *B.6.7.1 The Impact of Cybersecurity Requirements on Supply Chain*

Cybersecurity Maturity Model Certification (CMMC), introduced in January 2020, seeks to ensure that Defense vendors achieve specific levels of cybersecurity hygiene to protect the DoD supply chain. DoD drafted the CMMC model with support from university affiliated research centers, federally funded research and development centers, and industry. Even with industry involvement, however, CMMC has roiled the U.S. federal market. Defense suppliers and their first-tier suppliers now must achieve certification by independent auditors or they won't be able to get DoD contracts. Defense plans to use CMMC physical audits to check for foreign ownership and shell companies in the supply chain. Civilian agencies are expected to adopt the model once it has taken root.

#### *B.6.8 Contract Managers Need Supply Chain Management Knowledge*

Supply chain management requires participation and oversight by contract managers. Every link in a supply chain is joined and kept strong by contracts. Supply network risk management involves careful

contract planning to identify and engage alternative suppliers, and to ensure that contractors' supply networks and practices don't contain adversary-owned vendors, contain sufficient regional and international variation, avoid production methods that dangerously reduce inventory, and omit financially fragile companies.

It is clear that contract managers must ensure that contracts make explicit what supply chain risks vendors are responsible for. They also must ensure that contractors match organizations' missions, business objectives, and risk profiles. They also assess supplier performance. In companies producing consumer goods, contracting staff help manage the supply chain by ensuring goods are sustainably made, by free labor, in a free trade environment.

In the wake of the global supply crisis, contract managers will be called upon to help maintain and understand supply networks and monitor supplier risks ranging from cybersecurity to foreign ownership to propensity for natural, social, and political disaster. They will be expected to solicit alternative suppliers; assess financial and market stability—not just for prime contractors, but for their suppliers at minimum into Tier 2—and build supply network visibility and risk provisions into contracts. Further, they will need at minimum to participate in increasingly extensive and continuous supply chain monitoring as consumers of the data produced as a part of contract administration.

## ENDNOTES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