Project Management Processes

The major knowledge areas of project management are administered in a structured outline covering six basic clusters as depicted in Figure 3.3. The implementation clusters represent five process groups that are followed throughout the project life cycle. Each cluster itself consists of several functions and operational steps. When the clusters are overlaid on the nine knowledge areas, we obtain a two-dimensional matrix that spans 44 major process steps.

Table 3.1 shows an overlay of the project management knowledge areas and the implementation clusters. The monitoring and controlling clusters are usually administered as one lumped process group (monitoring and controlling). In some cases, it may be helpful to separate them to highlight the essential attributes of each cluster of functions over the project life cycle. In practice, the processes and clusters do overlap. Thus, there is no crisp demarcation of when and where one process ends and where another one begins over the project life cycle. In general, project life cycle defines the following:

1. Resources that will be needed in each phase of the project life cycle
2. Specific work to be accomplished in each phase of the project life cycle

Figure 3.4 shows the major phases of project life cycle going from the conceptual phase through the close-out phase. It should be noted that project life cycle is distinguished from product life cycle. Project life cycle does not explicitly address operational issues whereas product life cycle is mostly about operational issues starting from the product's delivery to the end of its useful life. Note that for oil and gas projects, the shape of the life cycle curve may be expedited due to the rapid developments that often occur in technology. For example, for an exploration technology project, the entire life cycle may be shortened, with a very rapid initial phase, even though the

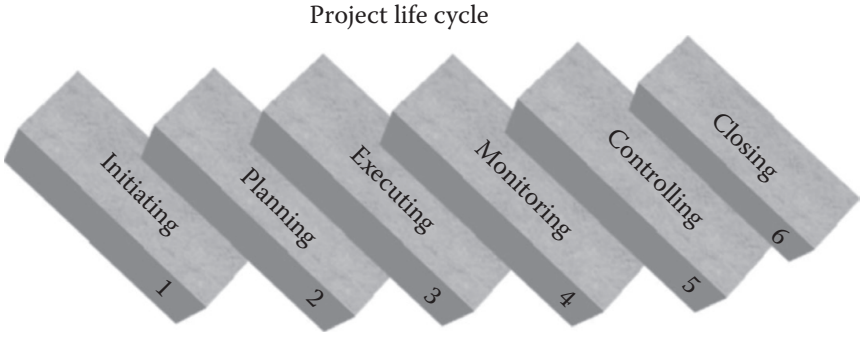

FIGURE 3.3
Implementation clusters for project life cycle.

TABLE 3.1

Overlay of Project Management Areas and Implementation Clusters

	← Project Management Process Clusters →				
Knowledge Areas	**Initiating**	**Planning**	**Executing**	**Monitoring and Controlling**	**Closing**
Project integration	Develop project charter Develop preliminary project scope	Develop project management plan	Direct and manage project execution	Monitor and control project work Integrated change control	
Scope		Scope planning Scope definition Create WBS		Scope verification Scope control	
Time		Activity definition Activity sequencing Activity resource estimating Activity duration estimating Schedule development		Schedule control	
Cost		Cost estimating Cost budgeting		Cost control	
Quality		Quality planning	Perform quality assurance	Perform quality control	
Human resources		Human resource planning	Acquire project team Develop project team	Manage project team	
Communication		Communication planning	Information distribution	Performance reporting Manage stakeholders	
Risk	Risk management planning Risk identification Qualitative risk analysis Quantitative risk analysis Risk response planning			Risk monitoring and control	
Procurement		Plan purchases and acquisitions Plan contracting	Request seller responses Select sellers	Contract administration	Contract closure

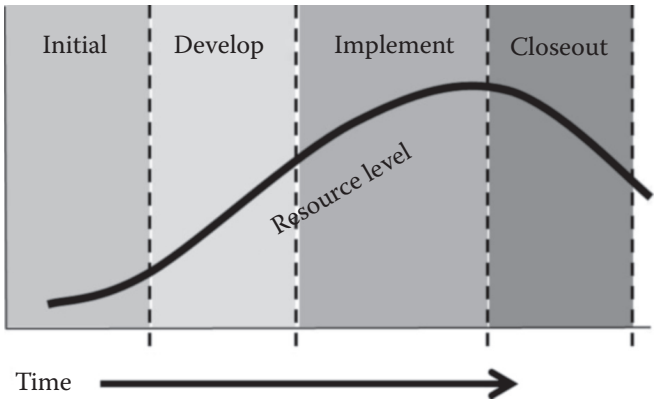

FIGURE 3.4
Phases of project life cycle.

conceptualization stage may be very long. Typical characteristics of project life cycle include the following:

1. Cost and staffing requirements are lowest at the beginning of the project and ramp up during the initial and development stages.
2. The probability of successfully completing the project is lowest at the beginning and highest at the end. This is because many unknowns (risks and uncertainties) exist at the beginning of the project. As the project nears its end, there are fewer opportunities for risks and uncertainties.
3. The risks to the project organization (project owner) are lowest at the beginning and highest at the end. This is because not much investment has gone into the project at the beginning, whereas much has been committed by the end of the project. There is a higher sunk cost manifested at the end of the project.
4. The ability of the stakeholders to influence the final project outcome (cost, quality, and schedule) is highest at the beginning and gets progressively lower toward the end of the project. This is intuitive because influence is best exerted at the beginning of an endeavor.
5. The value of scope changes decreases over time during the project life cycle while the cost of scope changes increases over time. The suggestion is to decide and finalize scope as early as possible. If there are to be scope changes, do them as early as possible.

The specific application context will determine the essential elements contained in the life cycle of the endeavor. Life cycles of business entities, products, and projects have their own nuances that must be understood and managed within the prevailing organizational strategic plan. The

components of corporate, product, and project life cycles are summarized as follows:

Corporate (business) life cycle:

Planning → Needs → Business conceptualization → Realization → Portfolio management

Product life cycle:

Feasibility studies → Development → Operations → Product obsolescence

Project life cycle:

Initiation → Planning → Execution → Monitoring and control → Closeout

This book covers the knowledge areas sequentially in Chapters 2 through 10 in the order listed above. There is no strict sequence for the application of the knowledge areas to a specific project. The areas represent a mixed bag of processes that must be followed in order to achieve a successful project. Thus, some aspects of integration may be found under the knowledge area for communications. In a similar vein, a project may start with the risk management process before proceeding into the integration process. The knowledge areas provide general guidelines. Each project must adapt and tailor the recommended techniques to the specific need and unique circumstances of the project. PMBOK seeks to standardize project management terms and definitions by presenting a common lexicon for project management activities.

Specific strategic, operational, and tactical goals and objectives are embedded within each step in the loop. For example, "initiating" may consist of project conceptualization and description. Part of "executing" may include resource allocation and scheduling. "Monitoring" may involve project tracking, data collection, and parameter measurement. "Controlling" implies taking corrective action based on the items that are monitored and evaluated. "Closing" involves phasing out or terminating a project. Closing does not necessarily mean a death sentence for a project, as the end of one project may be used as the stepping stone to the next series of endeavors.

Factors of STEP Project Success or Failure

There are several factors that impinge on the success or failure of a project. In oil and gas projects, factors that enhance project success include the following:

- Well-defined scope
- Communication among project team members

- Cooperation of project teams
- Coordination of project efforts
- Proactive management support
- Measurable metrics of project performance
- Identifiable points of accountability
- Realistic time, cost, and requirements

When projects fail, it is often due to a combination of the following factors related to project requirements:

- Requirements are incomplete
- Poor definition of project objectives
- Poor definition of scope and premature acceptance
- Requirements are unrealistic
- Requirements are ambiguous
- Requirements are inconsistent
- Changes in requirements are unbudgeted
- Poor management support
- Lack of alignment of project objectives with organizational objectives
- Poor communication
- Lack of cooperation
- Deficient coordination of project efforts

Work Breakdown Structure

WBS represents the foundation over which a project is developed and managed. WBS refers to the itemization of a project for planning, scheduling, and control purposes. WBS defines the scope of the project. In the project implementation template, WBS is developed within the scope knowledge area under the planning cluster. The WBS diagram presents the inherent components of a project in a structured block diagram or interrelationship flow chart. WBS shows the relative hierarchies of parts (phases, segments, milestone, etc.) of the project. The purpose of constructing a WBS is to analyze the elemental components of the project in detail. If a project is properly designed through the application of WBS at the project planning stage, it becomes easier to estimate cost and time requirements of the project. Project control is also enhanced by the ability to identify how components of the project link together. Tasks that are contained in the WBS collectively