in functionality to some existing system, or unnecessary will thus be removed from consideration. This topic is discussed next.

2. *Classifying and ranking IS development projects.* The second major activity in the project identification and selection process focuses on assessing the relative merit of potential projects. As with the project identification process, classifying and ranking projects can be performed by top managers, a steering committee, business units, or the IS development group. Additionally, the criteria used when assigning the relative merit of a given project can vary. Commonly used criteria for assessing projects are summarized in Table 4-2. In any given organization, one or several criteria might be used during the classifying and ranking process.

As with the project identification and selection process, the actual criteria used to assess projects will vary by organization. If, for example, an organization uses a steering committee, it may choose to meet monthly or quarterly to review projects and use a wide variety of evaluation criteria. At these meetings, new project requests will be reviewed relative to projects already identified, and ongoing projects are monitored. The relative ratings of projects are used to guide the final activity of this identification process—project selection.

An important project evaluation method that is widely used for assessing information systems development projects is called **value chain analysis** (Porter, 1985; Shank and Govindarajan, 1993). Value chain analysis is the process of analyzing an organization's activities for making products and/or services to determine where value is added and costs are incurred. Once an organization gains a clear understanding of its value chain, improvements in the organization's operations and performance can be achieved. Information systems projects providing the greatest benefit to the value chain will be given priority over those with fewer benefits.

Value chain analysis: Analyzing an organization's activities to determine where value is added to products and/or services and the costs incurred for doing so; usually also includes a comparison with the activities, added value, and costs of other organizations for the purpose of making improvements in the organization's operations and performance.

As you might have guessed, information systems have become one of the primary ways for organizations to make changes and improvements in their value chains. Many organizations, for example, are using the Internet to exchange important business information with suppliers and customers, such as orders, invoices, and receipts. To conduct a value chain analysis for an organization, think about an organization as a big input/output process (see Figure 4-2). At one end are the inputs to the organization, for example, supplies that are purchased. Within the organizations, those supplies and resources are integrated in some way to produce products and services. At the other end are the outputs, which represent the products and services that are marketed, sold, and then distributed to customers. In value chain analysis, you must first understand each activity, function, and process where value is or

TABLE 4-2 Possible Evaluation Criteria When Classifying and Ranking Projects

Evaluation Criteria	*Description*
Value Chain Analysis	Extent to which activities add value and costs when developing products and/or services
Strategic Alignment	Extent to which the project is viewed as helping the organization achieve its strategic objectives and long-term goals
Potential Benefits	Extent to which the project is viewed as improving profits, customer service, and so forth and the duration of these benefits
Resource Availability	Amount and type of resources the project requires and their availability
Project Size/Duration	Number of individuals and the length of time needed to complete the project
Technical Difficulty/Risks	Level of technical difficulty to successfully complete the project within given time and resource constraints

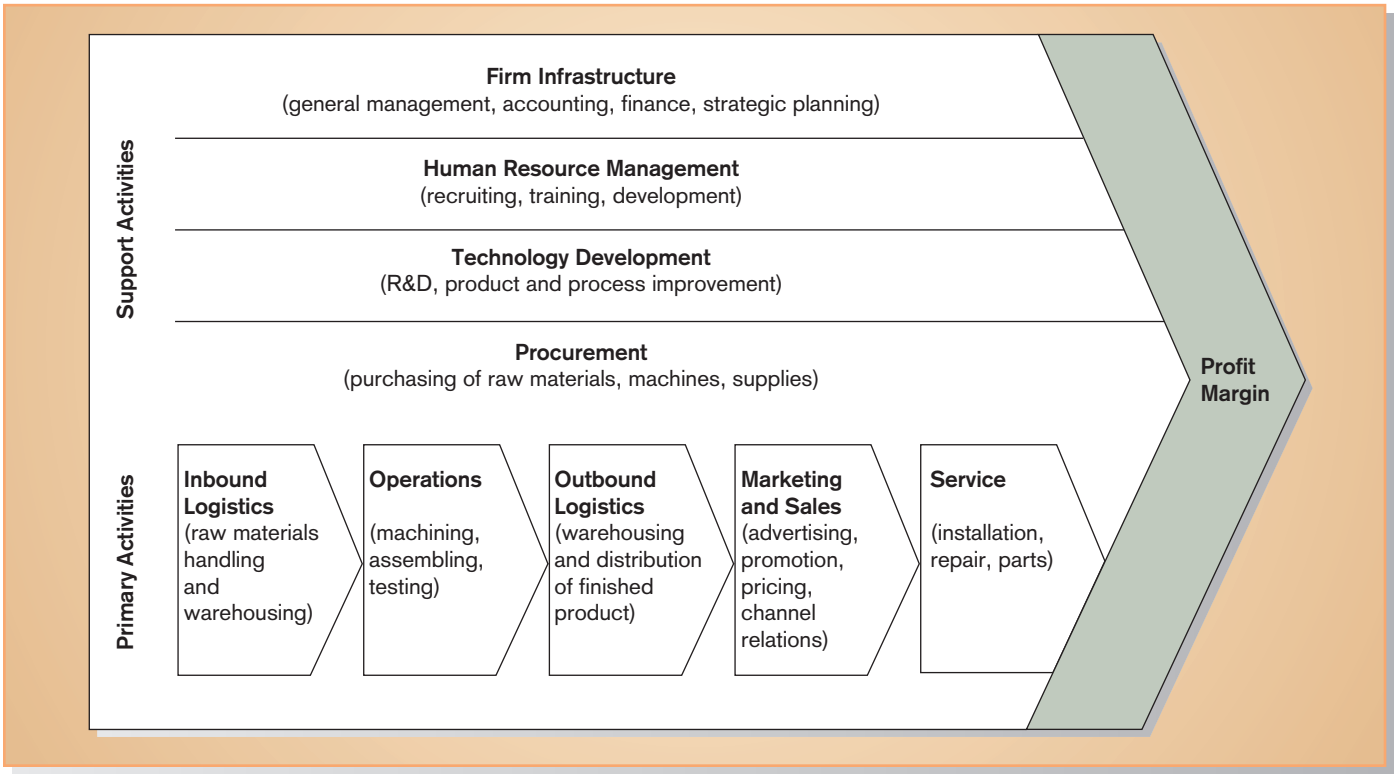

Figure 4-2
Organizational value chain
(*Source:* Reprinted with the permission of The Free Press, a Division of Simon & Schuster, Inc., from *Competitive Advantage: Creating and Sustaining Superior Performance,* by Michael E. Porter. Copyright © 1985 by Michael Porter.)

should be added. Next, determine the costs (and the factors that drive costs or cause them to fluctuate) within each of the areas. After understanding your value chain and costs, you can benchmark (compare) your value chain and associated costs with those of other organizations, preferably your competitors. By making these comparisons, you can identify priorities for applying information systems projects.

3. *Selecting IS development projects.* The final activity in the project identification and selection process is the actual selection of projects for further development. Project selection is a process of considering both short- and long-term projects and selecting those most likely to achieve business objectives. Additionally, as business conditions change over time, the relative importance of any single project may substantially change. Thus, the identification and selection of projects is a very important and ongoing activity.

   Numerous factors must be considered when making project-selection decisions. Figure 4-3 shows that a selection decision requires that the perceived needs of the organization, existing systems and ongoing projects, resource availability, evaluation criteria, current business conditions, and the perspectives of the decision makers will all play a role in project selection decisions. Numerous outcomes can occur from this decision process. Of course, projects can be accepted or rejected. Acceptance of a project usually means that funding to conduct the next phase of the SDLC has been approved. Rejection means that the project will no longer be considered for development. However, projects may also be conditionally accepted; they may be accepted pending the approval or availability of needed resources or the demonstration that a particularly difficult aspect of the system can be developed. Projects may also be returned to the original requesters, who are told to develop or purchase the requested system themselves. Finally, the requesters

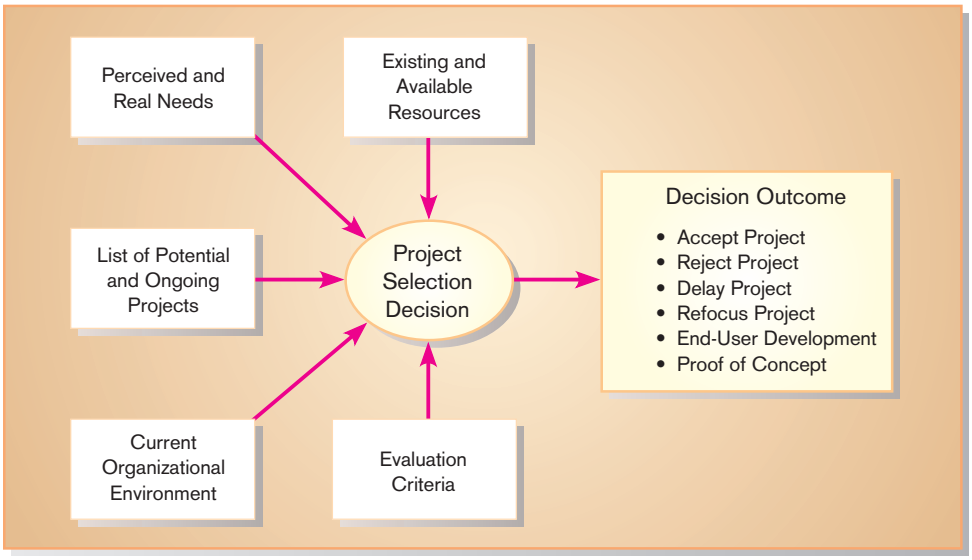

Figure 4-3
Project selection decisions must consider numerous factors and can have numerous outcomes

of a project may be asked to modify and resubmit their request after making suggested changes or clarifications.

One method for deciding among different projects, or when considering alternative designs for a given system, is illustrated in Figure 4-4. For example, suppose that, for a given system that has been identified and selected, there are three alternative designs that could be pursued—A, B, or C. Let's also suppose that early planning meetings identified three key system requirements and four key constraints that could be used to help make a decision on which alternative to pursue. In the left column of Figure 4-4, three system requirements and four constraints are listed. Because not all requirements and constraints are of equal importance, they are weighted based on their relative importance. In other words, you do not have to weight requirements and constraints equally; it is certainly possible to make requirements more or less important than constraints. Weights are arrived at in discussions among the

Figure 4-4
Alternative projects and system design decisions can be assisted using weighted multicriteria analysis

Criteria	Weight	Alternative A		Alternative B		Alternative C	
		Rating	Score	Rating	Score	Rating	Score
Requirements							
Real-time data entry	18	5	90	5	90	5	90
Automatic reorder	18	1	18	5	90	5	90
Real-time data query	14	1	14	5	70	5	70
	50		122		250		250
Constraints							
Developer costs	15	4	60	5	75	3	45
Hardware costs	15	4	60	4	60	3	45
Operating costs	15	5	75	1	15	5	75
Ease of training	5	5	25	3	15	3	15
	50		220		165		180
Total	100		342		415		430

analysis team, users, and sometimes managers. Weights tend to be fairly subjective and, for that reason, should be determined through a process of open discussion to reveal underlying assumptions, followed by an attempt to reach consensus among stakeholders. Notice that the total of the weights for both the requirements and constraints is 100 (percent).

Next, each requirement and constraint is rated on a scale of 1 to 5. A rating of 1 indicates that the alternative does not meet the requirement very well or that the alternative violates the constraint. A rating of 5 indicates that the alternative meets or exceeds the requirement or clearly abides by the constraint. Ratings are even more subjective than weights and should also be determined through open discussion among users, analysts, and managers. For each requirement and constraint, a score is calculated by multiplying the rating for each requirement and each constraint by its weight. The final step is to add up the weighted scores for each alternative. Notice that we have included three sets of totals: for requirements, for constraints, and overall totals. If you look at the totals for requirements, alternative B or C is the best choice, because both meet or exceed all requirements. However, if you look only at constraints, alternative A is the best choice, because it does not violate any constraints. When we combine the totals for requirements and constraints, we see that the best choice is alternative C. Whether alternative C is actually chosen for development, however, is another issue. The decision makers may choose alternative A, knowing that it does not meet two key requirements, because it has the lowest cost. In short, what may appear to be the best choice for a systems development project may not always be the one that ends up being developed. By conducting a thorough analysis, organizations can greatly improve their decision-making performance.

Deliverables and Outcomes

The primary deliverable from the first part of the planning phase is a schedule of specific IS development projects, coming from both top-down and bottom-up sources, to move into the next part of the planning phase—project initiation and planning (see Figure 4-5). An outcome of this phase is the assurance that careful consideration was given to project selection, with a clear understanding of how each project can help the

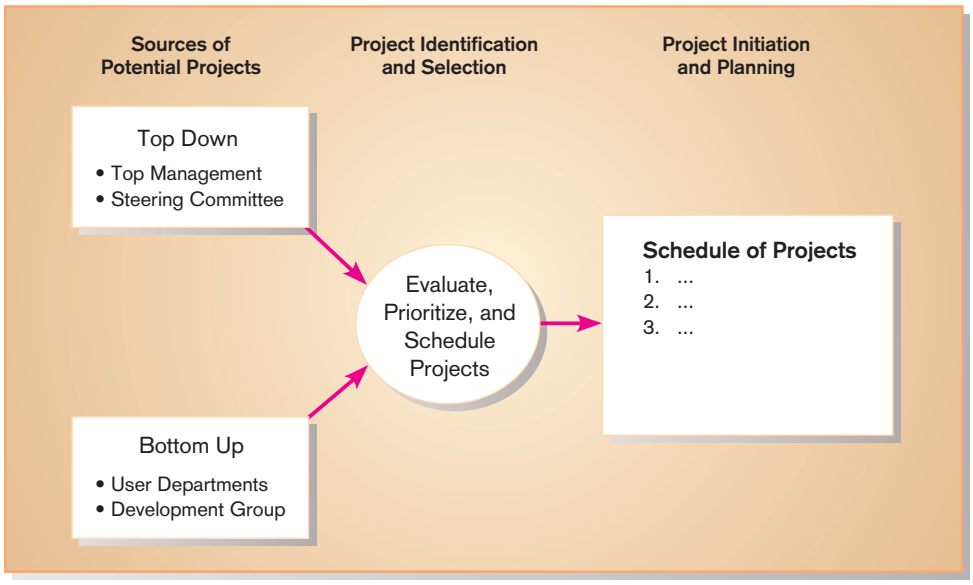

Figure 4-5
Information systems development projects come from both top-down and bottom-up initiatives

Incremental commitment: A strategy in systems analysis and design in which the project is reviewed after each phase and continuation of the project is rejustified.

organization reach its objectives. Due to the principle of **incremental commitment,** a selected project does not necessarily result in a working system. After each subsequent SDLC phase, you, other members of the project team, and organizational officials will reassess your project to determine whether the business conditions have changed or whether a more detailed understanding of a system's costs, benefits, and risks would suggest that the project is not as worthy as previously thought.

Many organizations have found that in order to make good project selection decisions a clear understanding of overall organizational business strategy and objectives is required. This means that a clear understanding of the business and the desired role of information systems in achieving organizational goals is a precondition to improving the identification and selection process. In the next section, we provide a brief overview of the process many organizations follow, involving corporate strategic planning and information systems planning, when setting their business strategy and objectives and when defining the role of information systems in their plans.

CORPORATE AND INFORMATION SYSTEMS PLANNING

Although there are numerous motivations for carefully planning the identification and selection of projects (see Atkinson, 1990; Kelly, 2006; Luftman, 2004; Ross and Feeny, 2000), organizations have not traditionally used a systematic planning process when determining how to allocate IS resources. Instead, projects have often resulted from attempts to solve isolated organizational problems. In effect, organizations have asked the question: "What procedure (application program) is required to solve this particular problem as it exists today?" The difficulty with this approach is that the required organizational procedures are likely to change over time as the environment changes. For example, a company may decide to change its method of billing customers or a university may change its procedure for registering students. When such changes occur, it is usually necessary to again modify existing information systems.

In contrast, planning-based approaches essentially ask the question: "What information (or data) requirements will satisfy the decision-making needs or business processes of the enterprise today and well into the future?" A major advantage of this approach is that an organization's informational needs are less likely to change (or will change more slowly) than its business processes. For example, unless an organization fundamentally changes its business, its underlying data structures may remain reasonably stable for more than 10 years. However, the procedures used to access and process the data may change many times during that period. Thus, the challenge of most organizations is to design comprehensive information models containing data that are relatively independent from the languages and programs used to access, create, and update them.

To benefit from a planning-based approach for identifying and selecting projects, an organization must analyze its information needs and plan its projects carefully. Without careful planning, organizations may construct databases and systems that support individual processes but do not provide a resource that can be easily shared throughout the organization. Further, as business processes change, lack of data and systems integration will hamper the speed at which the organization can effectively make business strategy or process changes.

The need for improved information systems project identification and selection is readily apparent when we consider factors such as the following:

1. The cost of information systems has risen steadily and approaches 40 percent of total expenses in some organizations.

2. Many systems cannot handle applications that cross organizational boundaries.
3. Many systems often do not address the critical problems of the business as a whole or support strategic applications.
4. Data redundancy is often out of control, and users may have little confidence in the quality of data.
5. Systems maintenance costs are out of control as old, poorly planned systems must constantly be revised.
6. Application backlogs often extend three years or more, and frustrated end users are forced to create (or purchase) their own systems, often creating redundant databases and incompatible systems in the process.

Careful planning and selection of projects alone will certainly not solve all of these problems. We believe, however, that a disciplined approach, driven by top management commitment, is a prerequisite for most effectively applying information systems in order to reach organizational objectives. The focus of this section is to provide you with a clear understanding of how specific development projects with a broader organizational focus can be identified and selected. Specifically, we describe corporate strategic planning and information systems planning, two processes that can significantly improve the quality of project identification and selection decisions. This section also outlines the types of information about business direction and general systems requirements that can influence selection decisions and guide the direction of approved projects.

Corporate Strategic Planning

A prerequisite for making effective project selection decisions is to gain a clear idea of where an organization is, its vision of where it wants to be in the future, and how to make the transition to its desired future state. Figure 4-6 represents this as a three-step process. The first step focuses on gaining an understanding of the current enterprise. In other words, if you don't know where you are, it is impossible to tell where you are going. Next, top management must determine where it wants the enterprise to be in the future. Finally, after gaining an understanding of the current and future enterprise, a strategic plan can be developed to guide this transition. The process of developing and refining models of the current and future enterprise as well as a transition strategy is often referred to as **corporate strategic planning.** During corporate strategic planning, executives typically develop a mission statement, statements of future corporate objectives, and strategies designed to help the organization reach its objectives.

Corporate strategic planning: An ongoing process that defines the mission, objectives, and strategies of an organization.

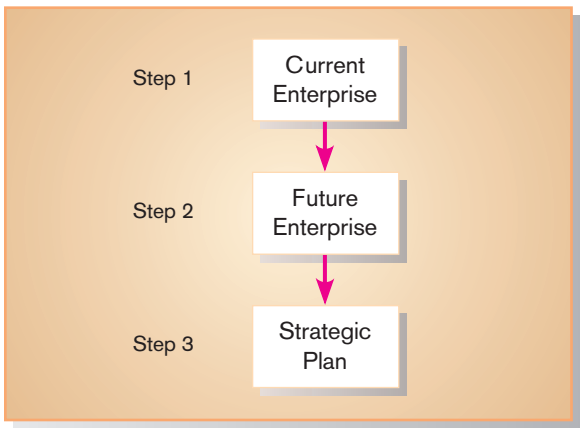

Figure 4-6
Corporate strategic planning is a three-step process