

CHAPTER 13

MANAGING THE SYSTEMS DEVELOPMENT LIFE CYCLE

The development of a new information system is a complicated effort. But it must be done. Manual systems are eventually automated and old systems become obsolete—either through changing needs in the organization or the introduction of new technology which makes old “dreams” more attainable, or both. This process is not a quick one. But systems are not replaced every month.

This and the next chapter present a very complete discussion of the *systems development life cycle (SDLC)*. Chapter 13 introduces the SDLC and presents some of the tools that have developed to automate the development process. It then covers the *systems strategy*, and *project initiation*, the first two stages of the process.

The objectives of this chapter are:

- to be able to identify the key stages in the systems development life cycle;
- to recognize how a firm’s business strategy will shape its information systems;
- to understand the relationship between strategic systems planning and legacy systems;
- to understand what transpires during systems analysis;
- to understand the TELOS model for assessing project feasibility;
- to be familiar with cost-benefit analysis issues related to information systems projects; and
- to understand the role of accountants in the SDLC.

I. The Systems Development Life Cycle

The *system development life cycle (SDLC)* is a model, or approach, to the development of new systems that guides the process to assure that the new system will be the best for the organization.

The SDLC is a five phase model:

1. Develop a *system strategy*;
2. The project is *initiated* by evaluating systems proposals;
3. Reasons for developing the system *in-house* are considered;
4. *Commercial packages* are considered; and
5. *Maintenance and support* follow the development and installation of the new system.

This chapter covers the first two phases. The latter 3 are discussed in Chapter 14.

A. Participants in Systems Development

There are three broad groups of participants in the process: *systems professionals, end users, and stakeholders*.

II. Systems Strategy

It should not surprise you that systems projects should be consistent with the strategic objectives of the firm. With that focus, a *steering committee* is formed that will assess the organizations strategic information needs, develop a strategic systems plan, and create action plans.

III. Assess Strategic Information Needs

Just as a company plans its budget according to priorities, strategic systems planning requires care. The book discusses three key issues that must be considered in the process.

A. Strategic Business Needs

Several issues are important: the *vision and mission* of the organization—so that system development is consistent, and the results of *industry* and *competency analysis*—where is the industry going, and how does the business fit.

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B. Legacy Systems

How does the old system support the mission of the company? How should the company move forward with its new system? The process is helped by the development of an *architecture description*—a formal map of the existing system. See **Table 13-1, on page 667.**

C. User Feedback

It is important for the organization to learn as much as possible from users about the key problems that must be corrected by a new system. This is done in a five phase process.

1. Recognizing the problem—the sooner that the problem is recognized, the easier it can be fixed. This process will be dependent on whether management is *reactive* or *proactive*.
2. Defining the problem—not just listing symptoms. This is not necessarily an easy task. And it can require extensive effort by the managers and computer professionals. The remaining three phases must be cooperative.
3. Specifying system objectives—in terms of what the new system must do, in general terms.
4. Determining project feasibility—deciding what approach will lead to success. This process is aided by the acronym **TELOS** which identifies various feasibility issues: technical, economic, legal, operational, and schedule.
5. Preparing a formal project proposal—to give management the information needed for deciding whether or not to proceed with the project. The proposal will do two things: summarize the findings of the study and show how the proposed system supports the business objectives of the firm. See **Fig. 13-2, on page 670** for a sample proposal.

IV. Develop a Strategic Systems Plan

After multiple proposals are prepared, the steering committee and systems professionals must evaluate the pros and cons of each and prioritize.

V. Create an Action Plan

Getting from the strategy to action is not an easy task. The *balanced scorecard* is a management system that helps make things happen. It also helps managers evaluate the benefits that technology can bring to the business. Four perspectives can help view the organization better: learning and growth, internal business, customer, and financial.

VI. Project Initiation

The project selected will be chosen based on detailed understanding of the user problems and of the proposed solutions. The chosen project will move on to the construction stage.

VII. Systems Analysis

Systems analysis is a process that is crucial to the success of the project. It is a two step process which looks first at the current system and then evaluates users's needs.

A. The Survey Step

Before planning a new system, it is important that the current system be evaluated carefully and thoroughly. There are both disadvantages and advantages of such a survey. The survey itself is basically fact gathering. It will look at many different aspects of the current system: *data sources, users, data stores, processes, data flows, controls, transaction volumes, error rates, resource costs, and bottlenecks and redundant operations*. A number of different techniques are used: *observation, task participation, personal interviews, and reviewing key documents*. All this information is needed for the second step.

B. The Analysis Step

This step ends with the preparation of a formal **systems analysis report** which presents management and/or the steering committee the results of the survey, the identification of the problem(s) and the

requirement of the new system. See **Fig. 13-5, on page 678** as an example.

VIII. Conceptualization of Alternative Designs

There is often more than one way to meet the requirement of a new system. This phase produces multiple plans for evaluation in the next phase. These plans should be general but include all the inputs, processes, outputs and special features in a manner that permits comparison. **Fig. 13-6, on page 679** shows two data flow diagrams for two alternative purchasing systems. This is a start in the process of deciding.

IX. Systems Evaluation and Selection

This process is designed to identify the best system choice. As such, it is a very important process involving two steps.

A. Perform a Detailed Feasibility Study

For each alternative design, the feasibility issues raised earlier should be reevaluated by informed evaluators including the project manager, user representatives and systems professionals. The group should also include a member of the internal audit staff. The key areas of feasibility (TELOS) must be considered in greater detail:

- *technical* feasibility is greatly improved when well-established technology is used vs. new;
- *economic* feasibility can be better evaluated now that technical details are known, but any changes in the economic climate must also be considered;
- *legal* feasibility deals with sensitive data etc.;
- *operational* feasibility considers the skills needed to properly use the system and the implied need for training; and
- *schedule* feasibility considers the time the new system can be up and running vs. when it is needed.

B. Perform Cost-Benefit Analysis

New system development projects can have very high costs. This is an investment for the business and should be evaluated using cost-benefit analysis. This is not necessarily easy since identification of the total

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costs and benefits are much harder to identify than in many other types of investments. There are three basic steps to the process.

1. Identify Costs

As in any cost-benefit analysis, there are two basic types of cost. *One-time* and *recurring*. The text will give you a good appreciation of these costs. See **Table 13-2, on page 682** and the accompanying text.

When examining a system proposal, one time costs include: hardware acquisition costs, site preparation, software acquisition, systems design, programming and testing, data conversion, and training.

Recurring costs include hardware maintenance, software maintenance, insurance, supplies, and personnel.

2. Identify Benefits

Benefits of a new system may be both *tangible* and *intangible*. **Table 13-3, on page 684** summarizes the tangible benefits in a not surprising way—increased revenues and cost reduction. Despite the importance of many intangible benefits, they are much harder to measure and quantify. **Table 13-4, on page 685** lists many and the accompanying text elaborates.

3. Compare Costs and Benefits

The text presents examples of using two key methods for comparison: *the net-present value method* and *the payback method*. Remember your cost accounting class. **Fig. 13-8 to 13-9(a) and (b), on pages 686-688** support the narrative.

C. Prepare Systems Selection Report

The primary output of this evaluation is the **system selection report** which includes the feasibility study, cost-benefit analysis and discussion of benefits of each alternative. A recommendation is made.

By this stage, the decision on how the system will be built should be clear. There are three possibilities, develop in-house, buy, or combine.

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D. Announcing the New System Project

The manner in which a new system project is announced is very important. Major changes affect how people do their jobs and how they interact with their colleagues. It must be “sold” to the rest of the organization.

E. User Feedback

Given the purpose of initiating a new system project, the people in charge must *always* be receptive to user feedback.

X. The Accountant’s Role in Managing the SDLC

There are two key reasons that accountant should care about new system projects. First they cost money—often big bucks. And second, the quality of the accounting information system is a function of the process that produces them.

A. How Are Accountant Involved with SDLC?

As first introduced in Chapter 1, accountants play three roles: as users of the systems, as part of the development team, and as auditors. By now, you should have a much better appreciation of these roles.

B. The Accountant’s Role in Systems Strategy

Auditors play a role to assure that resources are not wasted on unneeded, unwanted, inefficient, or ineffective systems.

C. The Accountants Role in Conceptual Design

Primary concerns relate to internal control and accounting conventions and legal requirements.

D. The Accountant’s Role in System Selection

The accountants are best able to assure the accuracy of the numbers used in analysis and comparison.

Review Questions for Chapter 13: 1-28

Discussion Questions for Chapter 13: 1-14