Chapter 13

Innovation and Strategic Planning

Learning Objectives

Upon completing this chapter, you should be able to:

- Define strategic planning and explain why it is important to achieving effective end-user information systems.
- Define characteristics of innovations, innovative people, and innovative organizations.
- Understand the relationships between technology and innovation.
- Discuss the use of technology to deliver products and services.
- Explain how technology can be used to restructure business processes.
- Give examples of how industries have used technology to gain a competitive advantage.
- Explain the role of R&D in developing technical solutions to problems..
- Offer guidelines for developing an EUIS strategic plan.

13.1 INTRODUCTION

> There is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the old institutions and merely lukewarm defenders in those who would gain by the new ones. The hesitation of the latter arises in part. . . from the general skepticism of mankind, which does not really believe in an innovation until experience proves its value.
>
> —Niccolo Machiavelli, 1513[1]

The concept of planning strategically for information technologies and linking use of technology to strategic business planning emerged in the 1980s. Until recently, however, such planning has focused primarily on an enterprise level for large-scale systems. The idea of planning strategically for EUIS has much credence, primarily because information technology users have much to offer in visioning the technological direction of the organization. In fact, evidence exists that end users are, indeed, included in decisions to adopt, use, and manage technologies.[2] Strategic planning for EUIS, which generally occurs on the business unit level, implies innovation, and it implies linking that innovation directly to business goals and missions.

Innovation is a two-edged sword; it is both applauded and feared. Although organizations acknowledge the value of new ideas, corporate cultures (in actuality) seldom foster and reward innovation. Technologies (innovations) bring opportunities as well as threats. Information technologies can help improve the way organizations and their employees at all levels perform work and provide products and services. However, information technology also poses threats to the status quo and the quality of work *life.* To take advantage of technology's opportunities and avoid its threats, planners and end

users must integrate carefully their use of technology with business operations and goals. Capitalizing on new opportunities requires foresight, careful planning, and good leadership.

The purpose of this chapter is to explain how innovations in the form of information technology fit into the strategic plan of an enterprise. In many cases, technology is the driving force for organizational directions. The chapter begins by explaining why planning is important to achieving widespread benefits from EUIS. Then, characteristics of innovations, innovators, and innovative organizations are discussed. Two models that describe how technological innovations are infused and assimilated by enterprises are presented. Strategies for restructuring work processes are discussed in the next two sections. The chapter concludes with an overview of strategic planning for end-user information systems.

In reading this chapter, the reader should keep in mind that innovation theory borrows from ideas discussed in previous chapters regarding worker performance, job design, and change management. This chapter should be read with a view to seeing how the need for improved organizational, workgroup, and individual performance affects planning for EUIS technologies.

13.2 EFFECTIVE USE OF EUIS MUST BE PLANNED AND MANAGED

Although every EUIS pioneer can recount examples of innovative applications, there are just as many tales of technologies collecting dust. Analysts would be shortsighted indeed to assume that plugging in the right equipment is sufficient. That is precisely what happens in most enterprises, however. Typically, analysts assess the business needs, recommend an equipment configuration, and, if the project is approved, install the system, arrange initial training, and then walk away.

Department managers are often mystified when new equipment is not used as anticipated. After all, the systems analyst identified a long list of appropriate applications, and staff members attended classes. A flurry of excitement followed the first few applications. Months later, however, everything seemed to have reverted to business as usual. Where does the department manager turn for help?

Innovative use of technology must be nurtured and managed. Skilled analysts can provide leadership through the stages of technological innovation. To succeed, analysts must work with end users to' understand how technology can contribute to improving operations and meeting business goals, but even more importantly, they must work to empower entrepreneurial workers to use new tools that allow them to apply their knowledge and creativity to create new value.

However, not all impacts of technology are beneficial. *Undesirable* consequences include routine, boring jobs; social isolation; shifting work bottlenecks rather than eliminating them; high absenteeism and turnover; excessive monitoring of work; and stressful work environments. Such outcomes may be related to inexperience with the technology, inadequate planning, or lack of foresight. Negative outcomes can be

expected when management focuses on short-term benefits or is insensitive to employee welfare. Whatever the reason, managers and analysts should not overlook the personal and organizational impact of new systems. In the long term, ignoring these issues lowers the quality of work life and productivity, as well.

We no longer have a choice as to whether or not to use technology; the question is how best to use it, as technology is an important resource to be managed and leveraged, just like the traditional resources of labor, materials, and capital. We've seen an explosion in the number of uses for information technology in the past few years. Many economists are crediting productivity growth and GD? as a result of improvements in information technology.[3] These results may be tempered, according to Roger W. Ferguson, Jr., a member of the Board of Governors of the Federal Reserve System, depending upon:

- the rate of investment in new equipment that embodies the new technology
- the rate at which the labor force is able **to** acquire needed skills.
- the fundamental potential of the technology itself.[4]

Moreover, the networked organization does more with technology than reengineer business processes or make a shift from hierarchical to team-based structures. Technology requires a radical rethinking of the nature and function of organizations, and their relationships to each other.[5]

No good idea succeeds on its own merit. Technology in and of itself is not sufficient: It *must* be coupled with changes in the way work is done, and these changes go far beyond the task level. Systemic changes are difficult to achieve, as reflected by the quotation at the beginning of this chapter, and few prescriptions for success are available. Managers or analysts can start, however, by looking more closely at the process of technological innovation.

13.3 ADOPTION. INFUSION. AND ASSIMILATION OF TECHNOLOGY

To apply technology innovatively, EUIS specialists must understand how it is used and assimilated into the work environment. Research shows that individuals or enterprises typically progress through a number of phases as they adopt, use, and assimilate new technologies. Various models have been developed by researchers to describe this process. Although these models vary somewhat in their description of the various stages, they all basically suggest an evolutionary process similar to that depicted in Figure 13-1, whereby an enterprise adopts an innovation (technology) and gradually learns to use (infusion) and assimilate it.

Progression through the stages of technological innovation is not automatic for many reasons. Enterprises may need to adapt their internal structures in ways that encourage employees to change the way they work. Work procedures and standards may be changed, work flow patterns altered, reporting relationships changed, jobs redesigned, and performance criteria revised. Executives may need to make changes in the enterprise's culture: its business philosophy; management style; departmental relationships; and relationships with its partners, suppliers, and especially its customers. Changes of this magnitude are easy to talk about but difficult to accomplish. As discussed in chapter 11, "Organizational Change," changing people's behavior is a complex and slow process, and may require the intervention of a skilled change agent.

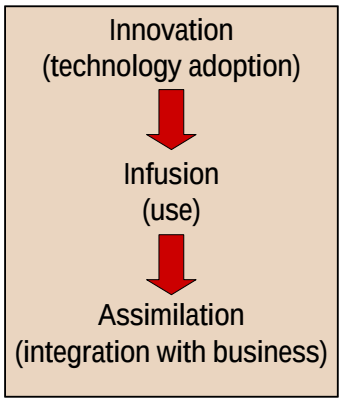


Figure 13-1 Basic innovation model

Employees who embrace technology and quickly fly on their own are the exception rather than the rule. Thus, placing a computer on an employee's desktop does *not* automatically lead to improvements and innovations. To use technology creatively, individuals must reach a "critical mass" of know-how and experience. Without appropriate training, support, and guidance, this critical mass may never be achieved amid the pressures of everyday work. Until individuals understand the potential opportunities and benefits, they have little incentive to expend the time and effort required to learn to use and apply the technology. Moreover, these efforts must be supported by an environment that fosters initiative and rewards innovation. Otherwise, the efforts of even the most innovative employees can be thwarted easily.
A planning team can bring together the technical resources, business expertise, and management decision making essential for innovative application of technology This implies not only that analysts must work closely with decision makers, but that executives should become more knowledgeable about technology. To recogonize new opportunities, executives do not necessarily have to know how the technology works. However, executives do need to understand how technology can address business problems.

13.4 INNOVATIONS, INNOVATORS, AND INNOVATIVE ENTERPRISES

As a basis for understanding innovativeness, this section presents characteristics associated with innovations, innovators, and innovative enterprises. As we discuss planning for EUIS, some important questions guide the discussion:

- What are the characteristics of the technology innovation that lead to productivity gains?
- What are the characteristics of the users that spur them on to achieve productivity gains?
- What are the characteristics of companies that achieve substantial productivity gains?

This section presents some useful descriptive models of technology infusion and assimilation.

13.4.1 Characteristics of Innovations

In *Diffusion of Innovation,* Everett Rogers defined an *innovation* as a *new idea, practice, or object that is perceived as new by an individual.*[6] According to Rogers, characteristics of both the innovation and the adopter influence the *infusion* (use) of technology Comparing two innovations, blue jeans (quick adoption) and the metric system (slow adoption), Rogers explained that their differing rates of adoption are dependent upon each innovation's (1) relative advantage; (2) compatibility; (3) complexity; *(4)* trialability; and (5) observability.

Rogers defines *relative advantage* as the degree to which the innovation is perceived as better than the idea it supersedes. *Compatibility* is the degree to which it is perceived as being consistent with existing values and past experiences. *Complexity* is the degree to which an innovation is considered difficult to use and understand. *Trialability* is the degree to which it may be experimented with on a trial basis. *Observability* is the degree to which the results of an innovation are visible to others.[7] Comparing these characteristics for blue jeans and the metric system, it is easy to see why nearly everyone wears blue jeans but few have completely adopted the metric system (in the United States).

Blue jeans are more rugged than most other pants (relative advantage), can be worn with most anything (compatibility), are simple to care for (not complex), inexpensive—until designer jeans came along at least (trialable), and nice looking (observable). The metric system, by comparison, basically replaces an incompatible system with which people are already familiar (little relative advantage), requires study and practice to use (complex), requires a major conversion effort to implement (not trialable), and does not physically change objects—just how they are measured (not observable).

Using these characteristics to describe information technologies, it is easy to see why electronic mail was slow to catch on. Yet, once a critical mass had the technology, its usage skyrocketed. Initially, facsimile was preferred as its speed far exceeded that of the fastest overnight delivery service (relative advantage). Facsimile, unlike e-mail, is paper-based (compatibility), and its basic features are as easy to use as a telephone (less complexity). It was integrated slowly into the workplace (trialability), and outputs were tangible to others (observability). Electronic mail, on the other hand, had slower adoption curves. While e-mail offers relative advantages over fax and overnight delivery services, it has many characteristics that do not resemble traditional communications (compatibility). For example, users who traditionally relied on secretarial support for letter writing and distribution found the responsibility shifted to themselves with e-mail. In addition, many early e-mail systems had complicated user interfaces (more complex). Moreover, use of e-mail requires the cooperation of others; recipients of messages are needed (trialability and observability).

However, once e-mail systems became easy to use, were integrated into a variety of other groupware products, and the relative advantage over other communication media was demonstrated, vast numbers began using the technology In short, the greater any

technology can score on these five characteristics-relative advantage, compatibility, trialability, observability, and (less) complexity—the faster its adoption will be.

13.4.2 Characteristics of the User Population

When implementing innovations, planners must take into consideration characteristics of the user population. Everett Rogers classified the general population with regard to its acceptance of innovations (here, technology).[8] The pattern of acceptance described here helps explain why new technologies may generate an initial enthusiastic response but never achieve the intended productivity benefits. Note that only the first group of users and possibly the second are apt to adopt innovations in the absence of specific strategies to promote use and modify business processes. These groups can be plotted on a bell curve, as shown in Figure 13-2.

Innovators are risk takers. They try new technologies just because the technology exists. They are always the first to try something new. Innovators typically have hoards of software catalogs and love gadgets. Innovators make up 2.5 percent of the population. This is the group that enthusiastically embraces new technology and sees the possibilities right away.

Early adopters wait until innovators have proven the technology useful, but once the usefulness is shown, are quick to implement the technology. Early adopters make up 13.5 percent of the population.

The *early majority* wait until the technology has been established useful by 16 percent of their peers. They are not quick to implement the technology but can be reasoned with once proof of the technology's value is well documented in the enterprise. The early majority makes up 34 percent of the population.

The *late majority* are real skeptics. They will use the technology only when it is well accepted by others and only after much trepidation. The late majority makes up 34 percent of the population.

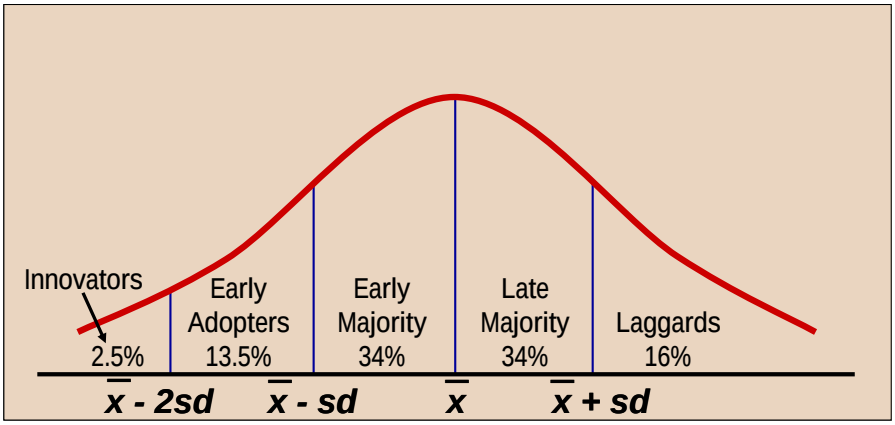
Laggards will use new technologies only when their resistance (screaming and kicking!) get them nowhere. They can be described as set in their ways and will change only under duress. Laggards make up 16 percent of the population.

13.4.3 Characteristics of Innovative Enterprises

Technology adoption has been described in relation to characteristics of both the technology itself and its users. Likewise, enterprises can be described as having characteristics that foster innovativeness. Innovation in enterprises has been defined as "the creation or adoption of new products, services, processes, or procedures. The capacity to innovate is central to the ability of an enterprise to adapt to changes in its environment."[9] In the *Harvard Business Review*, Quinn identified the following characteristics of small and large innovative enterprises in the United States and other countries.[10]

1. ***Innovation requires flexible management.*** Managers need to think carefully about how innovation fits into their strategies and to structure technology, skills, resources, and organizational commitments accordingly.

2. ***Innovation is an incremental process.*** Quinn's research revealed that "few, if any, major innovations resulted from highly structured planning systems." Rather, "major innovations are best managed as incremental, goal-oriented, interactive learning processes." (The OTA Model for Technology Innovation described later is such an incremental process.) Think about this incremental process in relation to the characteristics of users described in the preceding section. Gaining the acceptance of each group of users successively requires additional effort.



Adopter categorization on the basis of innovativeness

Figure 13-2 The innovativeness of the user population

Source: Reprinted with the permission of The Free Press, a division of Simon & Schuster, Inc., from *Diffusion of Innovations*, 3/e by Everett M. Rogers. Copyright © 1962, 1971, 1983 by The Free Press.

3. ***Successful managers of innovation attack a problem from several angles simultaneously.*** Innovative managers often encourage multiple efforts to address opportunities until more information becomes available. "Not knowing precisely where the solution will occur, wise managers establish the widest feasible network for finding and assessing alternative solutions. They keep many options open until one of them seems sure to win.. . incrementalism helps deal with psychological, political, and motivational factors that are crucial to success. By keeping goals broad at first, a manager avoids creating undue opposition to new ideas."
4. ***Effective managers of innovation allow for chaos within guidelines.*** In other words, managers avoid elaborate planning or control systems and manage by "setting goals, selecting key people, and establishing a few critical limits and decision points for intervention." Choosing among competing projects can be difficult, and the decision is often intuitive rather than scientific. Innovative companies also find special ways to reward innovators.
5. ***Management practices in innovative companies reflect the realities of the innovation process itself "***Innovation tends to be individually motivated, opportunistic, customer responsive, tumultuous, nonlinear, and interactive in its development." Innovative companies strive to keep their plans flexible and freeze them only when they become essential for strategic purposes, such as timing.

Managers must balance the need for continuity and stability with the needs for fostering creativity and nurturing innovation. This is a tough job. Technologies have characteristics that make them more or less likely to be adopted. People have characteristics that influence their attitudes toward adopting new technologies. Enterprises have practices that influence innovation. Few managers can afford to make many mistakes. Moving too aggressively can

mean making costly mistakes or causing chaos; moving too slowly, on the other hand, can lead to obsolescence.

13.5 THE INFUSION OF TECHNOLOGY: DESCRIPTIVE MODELS

This section presents two models which describe technology's infusion in enterprises: the OTA Model of Technological Change and Day's Five Stages of Office Systems Evolution. These two models are complementary and provide a useful framework for the planner by clarifying interrelationships among people, process, and technology

13.5.1 OTA Model of Technological Change

At the request of the U.S. Senate Committee on Labor and Human Resources and the House Committee on Education and Labor, the U.S. Office of Technology Assessment (OTA) studied the consequences of the rapid growth in the use of information and communication technologies in offices. In conducting this study, OTA used Joseph Coates's simple conceptual model. Depicted in Figure 13-3, the model provides a useful conceptualization of the process through which enterprises use and assimilate new technologies.[11]

According to the OTA model, when enterprises adopt new technology, three kinds of effects are likely: *substitution*, *adaptation*, and *transformation.*

Substitution Initially, direct substitution effects are seen at both the process and organizational levels. New technology replaces an older technology, human labor, or both. Word processing, spreadsheets, and databases replace the typewriter, bookkeeping ledgers, and payroll systems. E-mail augments telephone systems. E-commerce affects advertising, order entry, customer relations. . . everything! These changes have effects on productivity, the size of the workforce, job content,

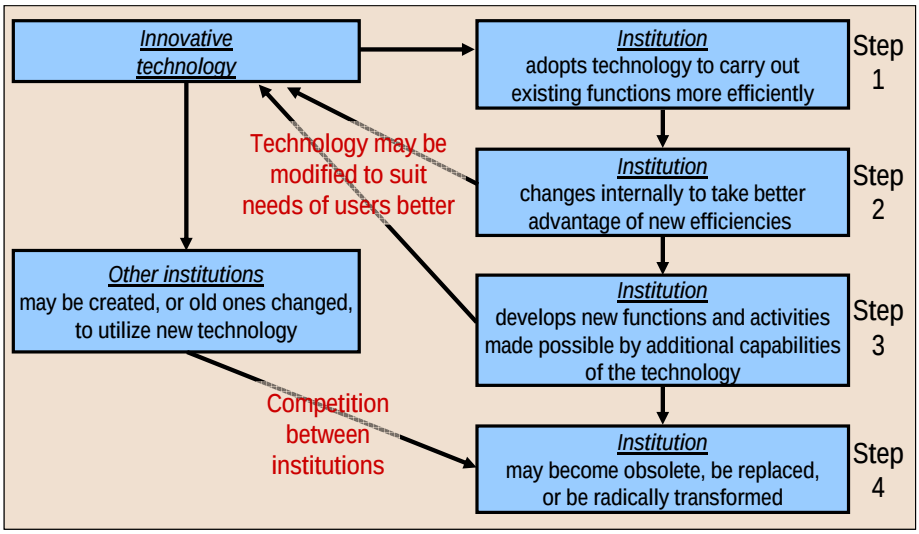


Figure 13-3 The OTA model of technological change

Source: United States Congress, Office of Technology Assessment. *The Automation of America's Offices.* (Washington, D.C.: Government Print Office, 1985) p.[10].

workers' skills, and other variables. These effects are perceived as good or bad depending on one's perspective and interests.

When technology is seen as substitution, institutional structures, culture, operating procedures, and management expectations still reflect the old work flow and business process. Tension may result because the characteristics of the new technology and/or the requirements for its use are different than what existed before the new technology was implemented. Until this tension is resolved, the full benefits of the substitution are not realized, and productivity may even fall. Many enterprises see technology as a new way of doing the same things.

Adaptation Gradually, the institution, deliberately or unconsciously, by plan or by trial and error, begins to adapt to new ways of doing things. This stage may include, for example, formal reorganizations, shifts in power relationships, adjustments in responsibilities, or changes in the way workers are recruited and compensated. Two kinds of problems, however, may arise in this stage. If significant changes are made quickly and arbitrarily, they may meet resistance from those who lose power or are uncomfortable with changes in the status quo—especially when people do not understand the reasons for the changes or have not participated in the decisions. On the other hand, if adaptations are not planned, those affected may undergo a long period of frustration and inefficiency before they discover what changes are necessary.

Transformations The third kind of effect, transformation, is possible because new technologies have entirely new capabilities that the enterprise may use to develop new activities, products, or services. For example, e-commerce not only *of*fers a more efficient way to do business, but also expands the potential for new business and relationships with customers, suppliers, and partners. Thus, new, potentially more effective activities replace the old.

Some enterprises, as soon as they are computerized, begin to offer new services. This round of effects may bring about the restructuring of an industry or a mix of industries. Some financial institutions, for example, have used new information systems to overcome legal boundaries between banks, insurance companies, brokers, and other elements of the industry. Likewise, higher education is using new technologies to provide a broader range of educational services.

Enterprises that fail to adopt new technology, even when it becomes the norm among competitors, risk eventual obsolescence and failure. For example, any mail order business that is not on the Web is in serious trouble.

The feedback loop in OTA's Model of Technological Change is important. Ongoing development of technology is shaped by the market and the demands of users. New businesses emerge that specialize in innovative use of the technology or in helping other firms use it.

13.5.2 Day's Five Stages of Office Systems Evolution

An early yet still useful model that depicts the evolution of technology was developed by L. H. Day of the Diebold Office Automation Group. Day's Five Stages of Office Systems Evolution focuses on how an enterprise moves from isolated tools to integrated systems. Like the OTA Model of Technological Change, Day's model characterizes the assimilation as an evolutionary process.'[2] This model may be even more relevant today

than originally because of the current thrust to downsize enterprises and place technology at the desktop.

1. ***Conception.*** In the conception stage, individual tools, like word processing or spreadsheets, are judged to be inadequate. The need to support knowledge workers directly with integrated tools is recognized.
2. ***Initiation.*** Planners look beyond cost-displacement applications and implement the first value-added pilot. Studies are initiated and requirements for a pilot are determined. Implementation begins.
3. ***Contagion.*** Integrated pilots are implemented (and evaluated) to improve the work of professional, multifunction clerical, managerial, and executive personnel.
4. ***Consolidation.*** Full operational systems are implemented to consolidate many developments in the contagion stage.
5. ***Creative evolution.*** Integrated systems are developed that are inherent in the plans to improve services, meet objectives, expand markets, and revise the mission of the enterprise.

Notice shifts in the progression through Day's stages. The first shift is from using new technologies as a replacement for old technologies or people to using new technologies for changing the way work is done. The next shift is from isolated applications to integrated systems. Then, the emphasis changes from applications for clerical workers to an emphasis on managers and knowledge workers. Finally, technology efforts shift away from individual tasks to focus on the objectives and mission of the enterprise. Understanding this pattern can help the planner determine where the enterprise currently is and predict action plans that need to be put into place to move the enterprise forward.

13.6 USING TECHNOLOGY TO REDESIGN BUSINESS PROCESSES AND GAIN COMPETITIVE ADVANTAGE

When left to chance, adoption, infusion, and assimilation of technology can be painstakingly slow. However, when planned, the process can be managed and accelerated. Through planning, enterprises can use EUIS to meet two major goals improve performance and give the organization a competitive advantage. Organizations can gain competitive advantage by creating innovative products and services and creating new delivery systems in the marketplace.

13.6.1 Using Technology as a Catalyst for Improving Performance

The ultimate image of the workplace of the future still may be hazy, but the trends are clear. The most significant productivity improvements have been achieved by using technology to change the way people work and the way business is conducted. Successful companies are adopting innovative work practices that get the most out of technology.

Information technology can improve employee performance by streamlining information processing, which improves accuracy and timeliness and eliminates unnecessary duplication of effort. By focusing on the more effective flow and use of

information, planners can work to allow users access to the *right information at the right time*. This approach requires that technology be adapted to people (not people to technology), so that it increases the effort focused on business goals and reduces the effort required for supplementary chores. Perhaps the most important performance enhancer is to support applications that begin with the individual user, empowering individuals and teams to do their work more efficiently and effectively.

> It is becoming evident that advanced computer technology calls for radical change in traditional practices. New technologies are being used as a catalyst to institute major changes in the way jobs are designed and enterprises are managed.. . . The old idea that a manager's main function is to control workers is replaced with the concept that a manager should encourage employees to use initiative.[13]

Because productivity increases do not result just from the speed of computer processing, the pertinent questions become the following. How can the analyst and/or manager facilitate innovation and shorten the learning curve? What are some of the successful techniques used by innovators? How can business processes be restructured? How can technology help empower individuals and work teams?

13.6.1.1 Replacing Old Procedures

For systems to become productive, technology-supported procedures must *replace* manual procedures, not continue them. Manual procedures must be eliminated when new ones have been learned. In practice, replacing the old with the new is not as simple as it may appear. For example, employees who are not yet confident of their computer abilities may cling to old, manual procedures to verify computer output or as a backup just in case something goes wrong with the computer. Employees may receive inadequate training, resist the intrusion from outside, or have insufficient motivation to change ingrained habits and practices.

E-business, for example, is changing the way office supplies are routinely ordered. Superstores are offering online purchasing of their products, and in many cases, buyers are developing systems that allow users to shop directly online with the store, skipping central purchasing departments. Such streamlining of activities replaces cumbersome purchasing orders, and more just-in-time ordering of supplies is cost effective.

13.6.1.2 Eliminating Work and Combining Tasks

Whenever possible, work procedures should be scrutinized *before* technology is implemented. Usually, this means looking at the overall work flow in an organizational unit instead of just individual tasks. Analysts should look for opportunities to simplify or eliminate work. This is a departure from the typical approach of identifying applications and recommending hardware and software based on existing tasks.

Japan's experience with high-technology robots illustrates the dilemma. In retrospect, some Japanese manufacturers discovered that in some cases they had programmed the inefficiencies of former technologies into their robots. They overlooked opportunities to streamline old procedures before automating them. For example, a different assembly sequence might be called for, or a robot might be able to perform two or three tasks simultaneously that would need to be done one at a time if they were performed

manually. Manufacturers are not alone. In the early days of office computing, the then-president of Xerox reported an inverse relationship between the dollars invested in technology and organizational productivity. He explained this relationship by saying these organizations were simply doing the wrong things faster!

Moreover, with the aid of technology, one individual may be able to handle a job from start to finish that formerly had been broken down into several steps performed by different people. Such task combination can reduce duplication of effort and improve coordination. For example, Monsanto redesigned previously separate jobs into *vendor account representative* positions, giving employees responsibility for all ordering and servicing for a specific group of customers. Many tasks in transferring work from one department to another and checking work in between departments were eliminated. Most importantly, the vendor account representatives took pride in servicing *their* customers. (Redesigning jobs and work flow was discussed in detail in chapter 12, "Business Process and Job (Re)Design.")

Many business processes that are performed sequentially can be restructured with technology to be performed concurrently, called parallel processing. Sequential processes often evolved due to a need to pass paper files of information from one individual or department to another. Online information, however, can be viewed simultaneously by many users in multiple locations. New groupware applications, for example, can make information available simultaneously to multiple work groups and help manage workflow (see chapter 4).

13.6.1.3 Finding Synergy between Technology and People

The most innovative improvements result from the synergy of linking people skills and technology. Analysts should devote time to analyzing the overall purpose of the work, as well as specific tasks and procedures that are to be performed. All too often, jobs are created by default, rather than by design, when new technologies are brought into the workplace. People need to be part of the design, not tangential to it. The ultimate objective should be a synergistic relationship between people and technology that will attract capable employees and encourage them to achieve their fullest potential and process information in the most efficient and cost-effective manner.

13.6.1.4 Changing Job Roles

Analysts should not limit technological solutions within existing job roles. For example, a tax accountant's use of tax preparation software *may* allow the accountant to do more tax returns or spend more time on analysis than on calculations. The result of the technology is that either a larger number of tax returns can be completed or more thoughtful tax returns can be completed. To the extent that more thoughtful tax returns equates to improvements such as reduced errors or increased savings to tax filers, it could translate into higher revenues than just doing more returns would.

Another example is professional and managerial use of word processing and electronic mail, which requires changes in secretarial roles. With decreased time spent on keying and rekeying text, secretaries' jobs could be expanded both horizontally (job enlargement) and vertically (job enrichment). Moreover, many professionals have found that replacing the pad and pencil with technology improves their writing and saves them time, as well.

13.6.1.5 Integrating Functions

Some opportunities require that enterprises integrate functions typically managed as separate entities. For example, groupware-based project management systems cross traditional lines that separated word processing, forms design, graphic services, and records management. (See chapter 4.) In her classic book *The Change Masters*, Rosabeth Moss Kanter referred to segmentation as *"the great inhibitor of creativity."*[14] She pointed out that in a segmented enterprise, units work in isolation. Little lateral communication occurs, relationships are restrictive, and members are indifferent to the efforts and achievements of other units. Innovative enterprises, however, can seize the opportunities afforded by computer technologies to integrate functions, thus reducing the limitations of excessive segmentation and opening the door to more creative efforts.

13.6.1.6 Making Systems Analysis More Innovative

The high level of structure characteristic of traditional systems analysis does not lend itself to creativity and innovation. Structured analysis can be unduly restrictive, especially with respect to the definition of problems and conceptualization of solutions. Systems analysis methods emphasize technically correct systems rather than usefulness of systems. Systems analysts must be encouraged to develop innovative systems, the result of analyzing a large number of alternatives. New development methods are helping the systems analysis process be more innovative.

Systems analysts generally rely on the user to explain how work is accomplished. These analysts seldom have the insight needed, because of limited business experience, to suggest new business processes. Conversely, users' inexperience with the technology limits their ability to envision how the technology could help solve problems. What is needed is an analyst with both perspectives. These emerging roles for systems analysts are vital to the innovative application of computer technologies to end users. Some firms provide opportunities for system analysts to take rotation assignments into business units to gain business experience.

13.6.1.7 Translating Problems into Opportunities

The way a problem is defined determines, to a great extent, the alternative solutions. For example, if the problem of a clerical operation is defined as escalating costs, the solutions usually focus on ways to reduce costs by using automation to eliminate jobs. If the problem were redefined as lagging revenue, the new definition suggests considerations for generating additional revenue to offset rising costs. Alternatives may call for investing additional dollars to train service personnel to better support marketing operations.

For example, a major life and health insurer was alarmed at the escalating costs of policyholder services. Services were provided by administrative departments in each of the company's independent agencies throughout the United States. The original task force identified the problem as excessive cost and recommended reducing operating costs by consolidating service in regional units or centralizing it at company headquarters. When results of the pilot test of regional service units were reviewed, executives recognized that they were missing opportunities. They had focused on cost reduction at the expense of quality service. The problem was redefined, and the new

objectives called for more personal, responsive service in concert with the company's marketing strategies. To accomplish that objective, the company formulated a strategy to use technology in ways that would improve service and reduce paperwork.
The ultimate solution turned a problem into an opportunity by changing the job focus from-paperwork processing to customer service. The company invested $10 million to ergonomically redesign offices; put a microcomputer (connected to mainframe insurance systems) on every desk; and restructure procedures, work flow, and employees' jobs. The *payback* was achieved in the long term by avoiding staff additions as the workload increased, attracting better-qualified agents to sell products, and improving the level of customer satisfaction.

13.6.2 Using Technology to Gain Competitive Advantage

The idea of information as a competitive weapon emerged from a growing aware-ness of the volume of information in today's computer systems and its value as a corporate resource. Alarmed by declining productivity and increasing global competition, many corporations seem to have picked up on the idea. Some experts are quick to point out, however, that an enterprise's strategic information system, if it is truly strategic, will be adopted quickly by competitors. "The iron law of market competition prescribes that those who do not imitate superior solutions are driven out of business."[5]
End-user computing has been credited with providing the biggest boost to the idea of technology as a competitive weapon. As long as corporate computers were locked away in data processing shops, which had months or years of backlogged requests for programming, managers rarely took advantage of electronically stored information. In the early 1980s, as managers began to manipulate data on microcomputers, they demanded more and better information. Progressive companies developed ways to give managers access to sources such as external databases that provide intelligence on competitors, markets, and inventory management systems. Putting computer power in the hands of the workforce (and helping employees learn to use it) has become a catalyst for innovative applications of technology The best ideas often come from those in close contact with the enterprise's tasks, products, and customers or even from the customers themselves. Such innovations are thus part of the culture of the firm.
Major success stories about technology as a competitive weapon, such as those about American Hospital Supply, General Electric, and American Airlines, have been well publicized in the business press. American Hospital Supply gave computer terminals to purchasing agents at hospitals, offering them direct information about products and prices as well as direct order capability. Hospital purchasing agents quickly adopted the system, as it made just-in-time inventory possible. General Electric generated a wealth of information that helped improve old products and develop new ones by creating a toll-free hotline for customer complaints and questions. American Airlines' SABRE system, a highly successful computerized reservation system, was built to address the internal problem of monitoring the inventory of available seats and attributing passenger names to booked seats.'[6] However, because of the system's ability to track individual users, American Airlines came up with the now universal Frequent Flyer program. American Airlines had the advantage for a while, but its competitors also were able to offer such services quickly.

Translating information into innovative products and services is not easy. Two approaches can be taken to help end users translate problems and opportunities into innovative solutions. The first approach is to allow and encourage people to combine and apply their tools and techniques to existing problems. The other is to smash established routines intentionally.[17] The best environment is one in which end users can experiment and learn from their experiences with information technology.[18] Two specific suggestions are offered in this discussion—to nurture innovation and to support research and development.

TOSHIBA: CHANGES COME FROM INSIDE AND OUT

Perhaps the greatest difference between **E-**transformation and previous trends like reengineering is this: It changes your customers' culture and business processes as well as your own. So you better make sure they' reready. About 2 years ago, Toshiba America Information Systems Inc. launched FYI, an Extranet for 350 North American dealers of its copiers, fax machines, and network printers. At that time, Amazon.com wasn't the household name it is today, and many dealer employees were essentially being asked to go online for the first time. "The key was making the first steps be very valuable to the customer," says Lisa Richard, Toshiba's VP of strategic planning. For that reason, Toshiba gave its dealers discounts and access to information they never had before, such as their own sales profitability down to the machine level. Says Richard, "The biggest mistake that companies make with new online systems is saying to customers, 'Here it is, come and get it."

Toshiba has continued to enhance FYI. It now includes a data warehouse, built with an Oracle database and Toshiba mapping tools that lets dealers see their 2-year sales histories by month and product model. The company recently added to the system its national ac counts business, by which Toshiba sells its products directly to large companies, and local dealers provide support. Later this fall, Toshiba will launch an online service for its dealers' 2,000 service reps called Service Information System, which will feature an Oracle8i database of CAD drawings, product schematics, and video clips.

"In the beginning, we had to help our customers change and feel comfortable about it," Richard says.

"Now their expectation levels are very high, and we can barely keep up." Richard is the first to admit that transformation doesn't come easily. "It wasn't just the customers—our own internal thought processes h_4d to change, too," she says. "There's always an inherent desire to stay with what's m place and keep costs down You have to be willing to chink away at that."

13.6.2.1 Nurturing Innovation

Innovation and creativity must be nurtured actively. Successful strategic systems are *not* a natural evolution from existing systems and a tradition of investing heavfly in reengineering business processes. A direct correlation exists between a strategic system's success and top management's support for its end users' creative application of information systems.

In a discussion of what he calls *third-era computing,* John F. Rockart, Director of the Center for Information Systems Research at the Massachusetts Institute of Technology, stated that new-product marketing opportunities are usually spotted by people on the firing line-.-people close to both markets and products and who have a working feel for the new information technology. Consequently, companies that do the best job of

managingtheir end-user computing resources also have the best chance of becoming the marketing leaders of tomorrow.. . . Indeed, the long-term value of end-user computing is accelerated learning on the part of end users. They learn more about the limits and opportunities of the technology.

More important, they discover *innovative* approaches to tasks that can actually transform the nature of the job being done.'[9]

In Rockart's view, the important distinction between computing in the first two eras and in the third era is the role of end users. During the first two eras (batch systems and online transaction processing), information processing remained under the control of data processing professionals. In the third era, computers have moved out of the realm of specialists "into the hands of end users—whoever and wherever they may be/'[20]

Rockart saw no end in sight as the growth rate of end-user computing is at least five times that of conventional systems. The major EUIS growth areas initially were word processing, business programs (such as accounting and sales analysis), electronic spreadsheet analysis, groupware, desktop publishing, presentation and business graphics, and writing new programs. Today, growth tends to focus on creative applications of Internet and Intranet technologies, improving and speeding processes and communications.

Rockart was ahead of his time. Even in the mid-1980s, he was describing the seamless web of computing services that are only beginning to take shape today. "Just as a society needs its highways, bridges, railroads, and airports to survive, so a company needs its 'seamless web' of computing systems."[21] This third-era computing requires the involvement of senior managers in ways that the first and second eras never did. The significance of this growth "is that computing systems are rapidly becoming a part of the corporate infrastructure, requiring senior management involvement. "

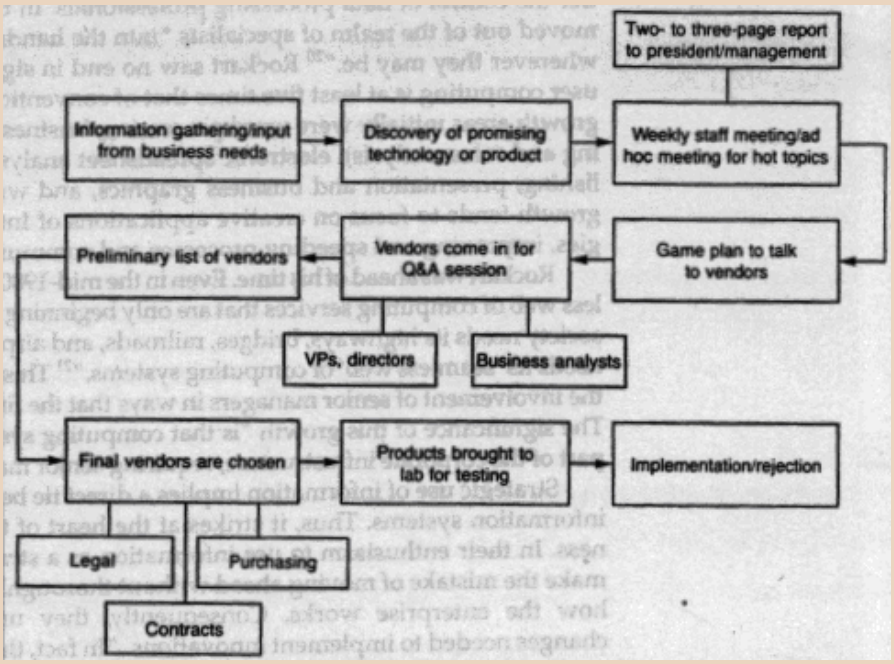
Strategic use of information implies a direct tie between business strategy and information systems. Thus, it strikes at the heart of the way enterprises do business. In their enthusiasm to use information as a strategic tool, many companies make the mistake of moving ahead without thoroughly researching and analyzing how the enterprise works. Consequently, they underestimate the structural changes needed to implement innovations. "In fact, the greatest drawback in managing information as a strategic tool may be the changes it often imposes on the way a company conducts its business and how its employees do their jobs."[23]

Strategically successful corporations understand the structure of their industry. They recognize the activities that can have the greatest impact on strategic success. They use innovative and creative thinking to search for and use information for competitive advantage. In addition, strategically important systems seem to develop best in an environment of broad communication and widespread understanding of corporate strategy. Strategic systems also seem to develop best in environments that facilitate and encourage the use of information technology by functional employees throughout the organization.[24]

In summary using information as a strategic tool is a complex challenge. Decision makers must understand the critical factors that affect the success of their business and how technology can impact those factors. They also must support organizational change and job redesign, and encourage and reward innovation at all levels of the enterprise.

13.6.2.2 Supporting Research and Development

Although the emphasis in this text has been on designing information systems in response to identified needs, the preceding discussion on strategic applications points out a need to experiment and take chances. Enterprises provide for such experimentation—or research and development (R&D)—in a number of ways. They may develop prototype applications, conduct pilot studies to evaluate alternative solutions to a problem, or fund technology R&D groups.



Fidelity's technology services group responds to users' needs and also explores blue sky technology by gathering information from research organizations such as the Gartner Group, reading periodicals like *Information WEEK,* and attending conferences on topics such as communications and artificial intelligence (AI).

If an engineer comes across an interesting technology or a vendor's idea for a new product, it can be discussed at a weekly staff meeting. If it's a hot item, the engineer can call for an ad hoc meeting.

At the meeting, engineers decide if the new technology or product can support the strategic goals and specific objectives of the company. They outline a plan for detailed research—talk to the vendor, attend conferences, read the industry press, check with the Gartner Group.

Engineers also can submit a two- to three-page report to Michael Simmons, president of Fidelity, and to managers and end users where appropriate, explaining the planned use of the technology. Several reports at several stages may be necessary to get final go-ahead.

If the research finds the technology promising, the group develops a game plan to talk to vendors. The vendors visit Fidelity, where they submit to a O&A session with engineers. They may be joined by business analysts from the systems group, who act as a conduit, carrying information from the technical specialists to the business end users and vice versa. Business analysts, who are organized as a task force, also evaluate the financial soundness of vendors, determining, for example, whether new vendors, who are historically poorly funded, have the resources to remain in business for a year or two. No commitments are made at this stage.

During the selection-of-vendors process, which Fidelity calls qualifying," other corporate people become involved. Directors and VPs attend to evaluate contract options—lease vs. purchase, for example—and financial and technical soundness of vendors. Purchasing managers and contract people then follow through after the initial meeting.

Fidelity whittles down the list of vendors for further discussion and more specifics. These meetings are often govemed by nondisclosure rules that protect everyone involved. At this stage, the legal department becomes involved, If Fidelity plans to enter Into a joint venture, which means swapping sensitive material with a vendor, the firm wants legal protection. Counsel also helps the purchasing managers, laying out the basis for a contract—whether it's a joint venture, custom-build, or straight purchase agreement.

Finally, the technology services group evaluates the products In an Isolation lab, poking and prodding to see if they will stand up to requirements and vendors' claims. If they do, final purchase or lease agreements are signed and implementation can begin. If they don't, the product can be rejected. For ATGs, there's room for failure; not every project comes to fruition.

Figure 13-4 Boston Fidelity Investments' route to new technology

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In short, managers must not be too efficient in resource allocation; they must encourage creativity in R&D. Rapidly developing technology surpasses our understanding of how to use it. The tendency to use new technologies as substitutes for the old usually produces short-term benefits at the expense of long-term opportunities.
Large enterprises that have the resources at their disposal often have internal R&D teams to experiment with the application of technologies. Some companies call these teams Advanced Technology Groups (ATGs). The flowchart in Figure 13-4 shows how one such group, the Technology Services group at Boston Fidelity Investments, operates. Boston Fidelity Investments responds to user needs and also explores "blue-sky" technologies. These groups often work closely with vendors, signing nondisclosure statements, testing new products before they are released for general sale. The company gets a product better suited to its needs, and vendors benefit from careful market testing of their products before release. Some of the products that ATG groups are looking at include artificial intelligence, supercomputing, voice recognition, data-entry alternatives, wireless networks, thin clients, application service providers (ASPs), intelligent agents, and multimedia, such as video streaming and Web casting. These R&D teams also serve as in-house technical resources for EUIS systems analysts who develop solutions to business problems.

Many companies view research and development groups as a luxury However, even those without formal research groups often encourage their analysts to experiment with new technologies. Such experiments usually are tied more directly to identified user needs than are R&D projects.

13.7 STRATEGIC PLANNING FOR EUIS

Information technology has become integral to business at every level. That means that any technology implementation—whether at the desktop, in the workgroup, or on the enterprise level—must be tied to the achievement of business goals and objectives; i.e. must take a strategic view. Whether implementing desktop productivity tools, local area networks, knowledge management, or any other technology experience clearly shows that just putting technology in place, does not necessarily mean that it will be used well. Technology should never be implemented without a clear business purpose in mind. To get results, it is important to have a clear sense of purpose and direction and a purposeful plan for making it happen. As the Cheshire Cat said to Alice in Wonderland, if you don't know where you're going, any road will do.

Strategic planning for EUIS is tied to line of business (or business unit) planning. This section explains what strategic planning is, why it is important, and who should do it. The discussion then provides an overview of the strategic planning process and explains how a strategic EUIS plan is put into action.

13.7.1 What Is Strategic Planning for EUIS?

Strategic planning is a process of defining business goals and objectives. It determines what an enterprise should do. In other words, it establishes direction. IT strategy should always relate directly to an enterprise's business goals, or business strategy

Strategic planning can be long term or short term and should not be confused with tactical planning or needs assessment. Tactical planning helps the enterprise do what the strategic plans say they should do. Tactical planning answers the question "how are we going to do this?" Thus, it is usually highly procedural, providing step-by-step details. The needs assessment, which is also an important part of implementing systems, looks at particular users or applications and establishes how the technologies can be applied. Both tactical planning and needs assessment should be guided by the enterprise's strategic plan.

Strategic planning for EUIS is the process of linking specific technology directions to organizational goals. In Figure 13-5, Pieter Ribbers, a professor at Tilburg

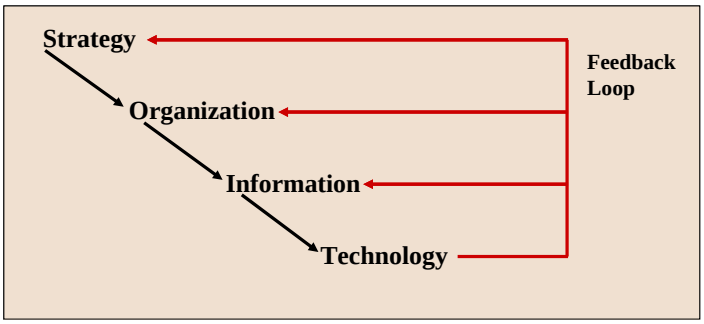

Figure 13-5 Technology as an enabler: The relationship among strategy, organization, information, and technology

Source: Pieter R. Ribbers, Keynote Address at the Office Systems Research Conference, San Antonio, Texas, March 1992

University, Netherlands, offers helpful perspectives on the relationship of EUIS to an enterprise's strategic plan.[25] Figure 13-5 shows the relationship among strategy, organization (structure), information, and technology. The diagonal arrows indicate the dependencies: Strategy dictates the appropriate organizational structure, which in turn dictates required information, which ultimately dictates the appropriate technology~ Technology is described as an enabler. The feedback loop shows how technology~ in turn, influences the other three variables.

For most businesses, a new competitive agenda has emerged. Providing high levels of quality and service are necessary but not sufficient conditions to remain in business. The strategic imperative for the business of the near future will be time and efficiency. Enterprises will be differentiated by their ability to compress time required for product design, manufacturing, delivery and service. The most common stumbling block to achieving these goals is the organization of the information work that supports the enterprise. Therefore, time and efficiency are the performance measures that determine the way information work should be organized and structured. Transform first, then automate is the message. Redesigning information work is for that reason a matter of process restructuring, and technology is an integral part of that. Management must be able to react more quickly to business cycle demands, which, in turn, mandates that workers and business processes be flexible.[26] Such improvements are possible with EUIS technologies, but only with careful planning linked to business strategies.

13.7.2 Why Is Strategic Planning Important?

Strategic planning for information techno1ogie~ requires that leaders understand the industry, environment, line of business, and operations. A strategic plan allows for "the manager to act with some confidence through an interactive, ongoing process of reading the business environment and assessing stakeholder expectations."[27] A big divide no longer exists between the business and the technology domain. Figure 13-6 places the business and technology domains together, and offers an appreciation of strategic planning problems facing managers in both domains.[28]

As shown in Figure 13-6, planning within the business domain and the technology domain should be parallel. In fact, planning for each domain requires interaction with the management from the other domain. While companies differ in structure, management complexity, and organization, the planning activities that lead up to information economics can be similar.[29] Figure 13-6 emphasizes the interrelationship of technology to the business.

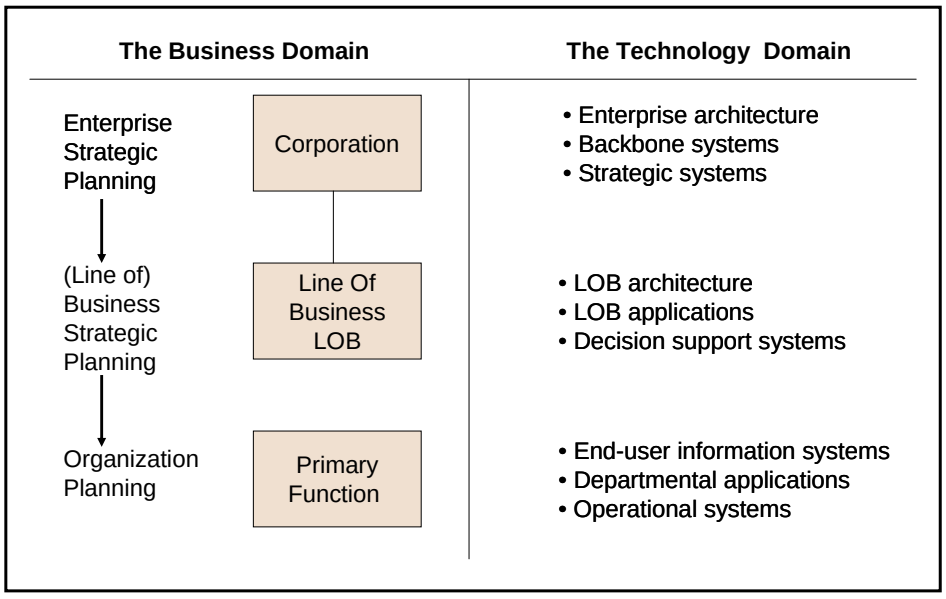

Figure 13-6 Planning for information technology: Where companies differ
Source: INFORMATION STRATEGY AND ECONOMICS by Parker/Trainor/Benson, © 1990. Reprinted by permission of Prentice-Hall, Inc., Upper Saddle River, NJ.

13.7.3 The Strategic Planning Process

The strategic planning process is intended to meet the following objectives:

1. Determine where the business unit or enterprise is with regard to a certain requirement.
2. Decide where the business unit should be at a certain date.
3. Develop strategies to achieve the desired result.

Strategic plans require making assumptions about future marketplace demands, which is always risky. To plan strategically for EUIS, managers also must predict where the technology is going. The fainthearted give up in despair, but wise business managers make their best estimates and remain flexible enough to correct the course en route. Dealing with Internet technologies makes the task even more challenging.

Important questions and considerations for beginning a strategic planning process are outlined in Figure 13-7. Here, the directions of the organization are detailed and decisions are made defining the scope of the planning process, as well as available dollars and other resources.

Once the directions are clear, the EUIS planners can use a structured strategic planning framework, such as the one outlined in Figure 13-8, as a blueprint for action. Although this framework originally was intended for strategic planning on an enterprise level, it is adapted here to serve as a guide to developing an EUIS strategic plan. Keep in mind that the focus of strategic planning for EUIS is generally on the level of business units. The method should be adjusted depending on the scope and complexity of the situation at hand.

1. ***Understand business strategies.*** Depending on the business, strategies may be explicit, implicit, or not fully developed. If they are not explicit, assumptions should be made for each major business unit and their reasonableness agreed to by the top management of those units. "If users are not well aligned with business strategy IS can only help them go the wrong way faster."[30]

QUESTION	CONSIDERATION
Where are we?	Nature of business or organization
	Current state of development
	Position relative to other organizations
Where do we want to go?	Capabilities and opportunities
	Assumptions
	Issues
	Objectives
How will we get there?	Strategy and policy
	Political pressures
	Programs, projects, and procedures
When do we want to arrive?	Priorities
	Timing
Who will be responsible?	Senior-level generalist at the helm
	Organization
How much will it cost?	Budget
	Resources

Figure 13-7 The strategic planning process

2. ***Determine critical success factors (CSFs)***. Critical success factors (CSF) are those things that an enterprise must do right to achieve its business goals. CSF planning methods require leaders to project themselves into the future and identify what would have happened if they were, indeed, to say that their enterprise had achieved

the intended goals. This process requires that the leaders be able to explain the business goals to the analyst and what will need to have happened for success to have occurred. The analyst, in turn, can use these critical success factors as baseline goals for systems planning.

3. ***Relate CSFs to information flows.*** Each critical success factor defines a set of management information needs. These needs are invariably interrelated, and the content, timeliness, accuracy, and form of the information to be consumed need to be interpreted. Allowance should be made for the variations in personal behavior and style that inevitably alter information consumption patterns over time. The likely sources (both external and internal) of the information should then be traced, and rudimentary flows from source to use established.

Departments and users have critical success factors just as enterprises do. The EUIS analyst would do well to help these groups identify their particular CSFs, and then integrate them with the larger IS strategic plan

1. Understand business strategies.
2. Determine critical success factors.
3. Relate CSFs to information flows.
4. Develop information technology assumptions.
5. Conceptualize information systems solutions.
6. Prioritize the solutions
7. Determine resource requirements.
8. Understand the available resource base.
9. Time-phase the solutions.
10. Formulate an action plan

Figure 13-8 EUIS strategic planning framework

4. ***Develop information technology assumptions.*** Just as the formulation of a business strategy is based on environmental and economic assumptions, an IT strategy must be based on assumptions relating to the availability, price, and performance of hardware, software, networking, and related technologies. Most of the forecasts upon which these assumptions can be based are readily available from trade publications and technical consultants. Increasingly, end users themselves come with a myriad of information and *misinformation* about technologies. Lured by the promises of vendors, end users sometimes understand the opportunities of technologies, but not the realities of their implementation. EUIS analysts should be prepared to explain technology alternatives and associated benefits and risks so that end users can make informed business decisions regarding technology options.
5. ***Conceptualize information systems solutions.*** Conceptualizing solutions involves matching the information flows and technology assumptions in steps 3 and 4 with an ordered list of potential applications. The selected solutions then must be assessed in terms of their architectural requirements. Architectural considerations relate to the physical compatability with enterprise architectures and networks, and the degree to which users have made direct control, and projected growth in usage.

It is important at this stage that requirement opportunities for business process restructuring be understood and considered.

6. ***Prioritize the solutions.*** Systems solutions vary widely in terms of their importance in the attainment of business strategies, although those of lesser importance often are prerequisites for more important applications. This prioritization should be based on both quantitative and qualitative evaluation of how critical each potential solution would be to achievement of the business strategy it supports and, secondarily, on any building-block interrelationships among solutions. Information economics and other methods for assessing the value of information technology, described in chapter 7, are useful during this phase.
7. ***Determine resource requirements.*** Determining resource requirements involves sizing the potential solutions and their architecture. It also requires estimates of the number of people who will be needed to develop and operate the system and the cash outflow to fund development and operation. In addition to quantity, the needed competencies and skill sets should be determined. EUIS projects vary in scope and, therefore, resource requirements. Increasingly, as end users themselves are coming up with innovative applications, they need to be aware of the opportunities and limitations of the overall system. Working with EUIS analysts, managers can judge whether or not solutions can be addressed within the current and planned systems architecture. Such discussions between EUIS analysts and line managers can help Information Systems Departments understand the information needs of the business and the individual user more completely.
8. ***Understand the available resource base.*** To stimulate fresh and incisive thinking about needs and solutions, the planning process intentionally has been structured up to this point to avoid the issues of technical, human resource, or funding availability. However, the pace of any practical plan has to recognize and strive to make maximum progress within availability constraints, and the purpose of this step is to identify these constraints. The scope of this assessment should include the quality as well as the raw capacity/quantity of the existing technical and human infrastructure within the enterprise.
9. ***Time-phase the solutions.*** The priority sequencing of solutions was largely determined in step 6. Now the solutions must be matched to the quality and capadty of development and operational resources available, plus those the enterprise can justify adding in the future. Many businesses undermine their strategic interests by taking an unnecessarily narrow view of their ability to fund and support beneficial systems projects. They often limit themselves by artificial year-to-year ceilings on computer and office equipment spending, rather than looking at the broader trade-offs from the perspective of cumula-. tive return on investment and strategic management effectiveness.
10. ***Formulate an action plan.*** In the past, too many thickly documented systems plans have wound up gathering dust. This is usually due to the absence of any strategic relevance. Often, a plan's death has been preordained by the simplistic assumption that processes were adequate to support new systems solutions. Implementing decision support, for example, requires leaders to adopt a more structured approach to planning and decision making. These new techniques should be defined within the plan. For example, if managerial/professional performance is the rationale for new systems, the plan has to come to grips with the knotty issue of how to assess

results at these levels. Furthermore, as new systems affect end-user involvement in the planning, development, and operational processes, fresh questions arise.

13.7.4 Who Should Do Strategic Planning?

The question of who should plan depends, in part, on the scope of the planning. Is the enterprise large or small? Will planning apply to the entire enterprise, a business unit, or one department? Is planning within the enterprise primarily centralized or decentralized? Strategic planning must be adapted by each enterprise to its own needs.

Strategic planning for EUIS is usually a responsibility of upper-level managers. In practice, however, planning for EUIS, if done at all, often is not done at top levels, nor is it strategic. Moreover, the limited planning that is done often focuses on the technology rather than achievement of business ~oals. Noted consultant N. Dean Meyer cautions that EUIS planning must do more than predict technologies. It also must forecast business needs, the broader business environment, the pace of organizational change, staff support requirements, and investment strategies. Thus, planning should not be done by staff groups alone.[31]

In many enterprises, strategic planning for information technology focuses on large IS applications, not EUIS. Strategic planning for EUIS tends to be a byproduct of line-of-business strategic planning. Often, high-level technical staff, directly accountable to senior management, are responsible for relevant research and recommendations. Strategic planning, involving business process restructuring$_1$ is generally of a magnitude that can be authorized only at top levels. Often, it exceeds the scope of end-user systems and calls for integrating all information systems.

Systems integration is not easy. The ability of most businesses to assimilate and apply EUIS lags far behind the opportunities—a strategic void that can be critical. Senior executives often believe that they should receive more benefit from technology investment, but few are able to articulate how those benefits should be achieved. The process itself can appear bewildering to enterprises that do not have the staff or organization to pull key players together to develop a cohesive company strategy. In such cases, enterprises may hire a consulting firm to provide direction. External consultants can offer a broad exposure to similar problems in other enterprises and structured planning methodologies.

Ideally, a consulting firm provides an unbiased, outside perspective to balance the concerns of management. Involvement of both technical and business specialists is essential for planning a strong, practical approach to end-user information systems. To be effective, the consulting firm needs to work closely with the IT organization (who understand the potential of the technology) and the line managers (who know the business).

13.7.5 The Strategic Plan

A strategic plan for technology forms the basis for determining which applications should be addressed in what order. It should help executives answer several basic questions concerning information systems activities such as the following: Are there competitive opportunities in my industry that technology can help implement? Is the company spending its information systems budget effectively on the appropriate applications? Are the leadership and organization for EUIS appropriate for the role

information now plays in the enterprise? What applications will produce the greatest business benefits? To develop a strategic plan for EUIS, planners must study the enterprise's long- and short-term business needs. Planners who develop an EUIS strategic plan should ensure that the plan:

1. ***Supports business goals as defined in the corporate strategic plan.*** In overall management planning, information systems are tools that can help an enterprise implement its business strategies. It is easy to lose sight of the role information systems play in the enterprise and to plan as if these systems were an end in themselves. Focusing on business objectives defined in the corporate strategy helps keep information systems planning in proper perspective.
2. ***Responds to management concerns and changing business requirements.*** A plan must be sufficiently flexible to take advantage of new opportunities or to address unexpected problems.
3. ***Coordinates with overall information systems or information management planning.*** Regardless of whether EUIS is part of a larger IS organization or has a separate reporting structure, plans and programs must be complementary and compatible. In an increasing number of enterprises, information systems leaders play a major role in strategic planning.

Once formulated, strategies are written in report format and submitted for management approval. Figure 13-9 illustrates the table of contents for a strategic plan. Generally, someone from the planning team makes a formal presentation to management, using slides or other appropriate presentation tools to help focus attention on key points. Clear explanations of objectives, business justification, recommendations, costs, and benefits are vital to gaining support. Top-management approval of the EUIS strategy is a key step in obtaining commitment to EUIS programs.

A Strategic Plan for
End-User Information Systems

Figure 13-9 A strategic plan for EUIS

13.7.6 Putting the Strategic Plan into Action

Putting strategic planning into action requires mission statements, policies, programs, projects, and procedures. A *mission statement* is a clearly delineated statement of the major goals and objectives of the business unit. *Policy,* which is the strategy in written words, reflects guidelines developed by top management regarding major issues. The following is an example of a policy for the implementation of EUIS:

> *EUIS policy provides for the development of an information network that balances the needs of individual users and departments against the overall corporate needs and objectives. Within that framework, the information systems architecture will provide as much flexibility as possible.*

Programs put policies into effect. Programs refer to the series of efforts needed to follow through on the policies. *Projects,* the next level of activity, serve the objectives of programs. Several projects may be needed to implement one program. The most precise, measurable unit of activity is *procedures,* which are specific methods for accomplishing work activity, The following examples of this hierarchy are based on the EUIS policy described earlier.

Example of a Program:

- Develop a corporate Intranet that streamlines internal operations and improves responsiveness to customer needs.

Examples of Projects:

- Pilot test CourseInfo software to deliver training online.
- Develop a knowledge management system to support sales and customer service.
- Merge the mail- and telephone-order sales entry systems with the Internet-order entry system.
- Develop an office supplies ordering system.

Examples of Procedures:

- All microcomputer users who require access to warehoused data will submit a request form, authorized by the vice president of their division, to the Information Systems Department.
- All users needing access to the training software should develop their own four-digit codes and request a password from the systems manager.

In short, policies, programs, projects, and procedures are needed to support tactical plans. Tactical plans are linked directly to strategic plans of the larger IS and EUIS strategic plans. Subsequent chapters in part V offer foundations and a specific approach to develop EUIS projects. An EUIS project's ultimate success, however, often relies on its strategic value—how it supports changing information needs, organizational structures, and the enterprise's strategic plan. Only then will information technology transform the enterprise.

13.8 SUMMARY

EUIS strategic planning is part of an important process that aligns use of technology with business goals and objectives. Business needs should drive the selection of technology, but, at the same time, technology is an enabler that creates new opportunities for the business. The major opportunities offered by EUIS technologies are associated with their potential for transforming the way work is done. Thus, fostering innovation is an important aspect of strategic planning.

Although enterprises acknowledge the value of new ideas, corporate cultures do not always foster and reward innovation. Technologies, like new ideas, bring both threats and opportunities. Capitalizing on technology to improve performance and quality of work life is complex and challenging. It requires foresight, careful planning, and good management.

Innovation is best characterized as a process whereby individuals or enterprises adopt, use, and assimilate new technologies. Rogers suggested five characteristics of innovations that influence adoption of new technologies: relative advantage, compatibility, complexity, trialability, and observability. Rogers also described people as to how receptive they are to innovation on a scale ranging from the very innovative to laggards. Quinn revealed the characteristics that innovative enterprises have in common: flexible management, attacking problems from several angles simultaneously, allowing for chaos within guidelines, and freezing plans only when necessary.

The infusion and assimilation of technology into the work environment is a change process. Two conceptual models of technological change were presented. The Office of Technology Assessment's (OTA) Model of Technological Change, developed by Joseph Coates, describes the process in three stages: substitution, adaptation, and transformation. L. H. Day of the Diebold Office Automation Group offers a five-stage model: conception, initiation, contagion, consolidation, and creative evolution. Left to chance, the adoption, infusion, and assimilation of technology can be haphazard and painstakingly slow. However, the process can be managed and accelerated through effective strategic planning directed at transforming business processes.

Transforming business processes requires innovative approaches to business needs. When technology is used innovatively, it offers new opportunities for managing information and empowering individuals and work groups. EUIS planners and analysts are challenged to design systems that capitalize on technology for productivity improvement and competitive advantage. Enterprises that succeed will reap benefits in improved products and services.

Without strategic planning, enterprises miss opportunities and often gain only immediate, short-term benefits. Strategic planning is a process of defining major business goals and objectives for an enterprise. It identifies actions required to move an enterprise from where it is to where management determines it should be. A strategic plan for EUIS should support the goals defined in the corporate unit strategic plans. Strategic plans are translated into action through policies, programs, projects, and procedures.

KEY TERMS

- Adaptation
- Assimilation
- Catalyst
- Compatibility
- Competitive advantage
- Complexity
- Infusion
- Innovation
- Laggard
- Mission statement
- Observability
- Policies
- Programs
- Procedures
- Relative advantage
- Strategic planning
- Synergy
- Trialability

DISCUSSION QUESTIONS

1. Define the term *innovation.* Why is it a "two-edged sword"?
2. Are you a technology innovator, a laggard, or somewhere in between? Can you describe colleagues, friends, and family in terms of these categories?
3. What is the relationship between technology and innovation?
4. What do the two models of technology infusion show about technology's assimilation in enterprises?
5. The text makes a number of suggestions about using technology as a catalyst for performance improvement. Why do you suppose these approaches are not used more widely?
6. List characteristics of companies that have used technology successfully as a competitive weapon. What do these characteristics suggest about their management style?
7. What is strategic planning? Why is strategic planning for EUIS important?
8. Who usually is responsible for strategic planning in an enterprise? Why would responsibility reside at that level?
9. How are strategic plans put into action in an enterprise?

APPLICATION EXERCISES

1. Working with a group of classmates, identify an office, small business, or other organizational unit with which you are familiar, and brainstorm ideas for using technology to improve performance or give it a competitive advantage. How would such changes alter the way products or services are provided? How would they improve productivity? How would they affect employees' jobs? Which ideas do you

think would be most profitable? Summarize your recommendations to share with the class.
2. Identify an EUIS application at your college or a local business that you feel is innovative. In what way is it innovative? Who thought of the idea? How was it implemented? What technology is involved? Were the changes implemented when the technology was installed or afterwards?
3. Using current literature such as *Business Week* or trade publications (see list at end of text for suggestions), give examples of how industries have used technology to gain competitive advantage. What was required to turn the idea into action?

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