Harnessing IT to Drive Enterprise Strategy

BY MICHAEL HUGOS

To put it plainly, the chief information officer (or CIO) in any enterprise is the person responsible for two things. One is a thankless task and the other is a high-risk undertaking. The thankless task is to make sure the enterprise systems infrastructure is operating correctly and efficiently 24 hours a day, seven days a week. The high-risk undertaking is to continually evolve and enhance that infrastructure so that it remains properly aligned and able to deliver what the enterprise needs to drive its evolving business strategy. This chapter explores ways that strategically minded CIOs respond to and handle the many elements of risk that come with IT leadership positions.

It has become abundantly clear that successful CIOs figure out ways to delegate systems operations tasks to others so that they can devote most of their time to that second thing, the high-risk task of alignment and use of systems infrastructure to drive enterprise strategy. This is where successful CIOs bring the most value to the enterprises that employ them. High risk also means the potential for great rewards, and CIOs who effectively collaborate with other executives to reap those rewards for their enterprises are indispensable players on any senior management team.

In most enterprises it is useless to discuss IT strategy without simultaneously discussing business operations strategy. As operations evolve and grow, they must be effectively supported and enabled by a company's IT infrastructure. If the IT infrastructure does not evolve to deliver the needed

capabilities, the enterprise will be unable to change and grow its business operations. The CIO is the "C"-level executive best positioned to develop an overall understanding of a company's operations and the systems that drive those operations. Successful CIOs use this understanding to be key players in shaping both business and IT strategy.

PART 1
RELATIONSHIP OF IT STRATEGY TO ENTERPRISE STRATEGY

Just as the chief financial officer (CFO) is the senior person responsible for devising the capital structure best suited to an enterprise's business needs, the CIO is the senior person responsible for making sure that the enterprise's IT infrastructure best supports its business needs. The CIO is the senior-level liaison between the business and technical sides of an enterprise. The CIO is the person who helps define and translate business goals and strategies into systems performance requirements and oversees a portfolio of IT development projects to deliver systems that meet these requirements.

In the information age, the competent and dynamic use of information technology is a requirement that all enterprises must meet in order to succeed. IT underpins every operation within an enterprise, and in fact it is hard to speak of operations and IT as separate entities any more. They are so intertwined and most business operations are so utterly dependent on information technology that it is usually pointless to think of them separately.

Therefore any valid business strategy rests on assumptions that the enterprise already has or can soon acquire the information systems it needs to achieve performance levels called for by the strategy. Strategies calling for operating capabilities and performance levels that cannot be attained are strategies doomed to fail. Perhaps in the 20th century IT considerations were of secondary concern to business strategists; in the 21st century IT considerations are central to any viable business strategy. As we discuss strategy and tactics for effective use of IT we will use precise definitions for these terms that provide a framework for clear thinking and communication (see Sidebar).

IT Strategy Follows Enterprise Strategy

All enterprises have a set of goals either explicitly stated in a formal business plan or implicitly stated in the culture and conversations within the senior management team. The CIO needs to know these business goals. Make sure you know them by heart.

Once the CIO discovers the enterprise's goals, the next step is to define an IT strategy or strategies to accomplish these goals. Remember, a strategy is simply a way of using the means or capabilities available to a business to achieve its goals. Often, a business executes its strategy by building or enhancing systems to do the things called for by the strategy.

Strategic IT Questions—Starting from Scratch   Good strategy starts with asking the right questions. Strategy is the result you get from answering the questions you ask. Strategy that comes from answers to the wrong questions is useless strategy even if the answers themselves are correct. This is what is meant when people say generals often have great strategies to fight the last war instead of to fight the war they are in.

Generals, and all the rest of us as well, have a tendency to ask questions that are no longer all that relevant. We ask questions pertaining to the details of a situation that is now passed. We tend to ask these questions because we already know the answers. We learned them from our past experience. The trick is to learn from our experience and yet remember that the future will be different in some important respects from our experience in the past.

Here are some questions to ponder as you think about your IT strategy:

- What can IT do to enable my enterprise to accomplish its goals?
- What business initiatives are planned over what time period?
- What operating capabilities does the enterprise need to successfully carry out these initiatives?
- What is the conceptual design of the IT systems infrastructure that will enable the enterprise to possess the operating capabilities it needs?
- How can the existing IT infrastructure best be leveraged to meet enterprise needs?

Defining the IT Strategy

To define your IT strategy, begin by listing a set of desired performance criteria that IT should meet in order to enable the enterprise to accomplish its goals. Robert Kaplan and David Norton in their landmark 1992 *Harvard Business Review* article, "The Balanced Scorecard—Measures That Drive Performance" defined four perspectives that create a comprehensive view of an enterprise's performance (see Chapter 5 for specific applications of the Balanced Scorecard to IT performance measurement and management). Define the desired performance criteria that you expect IT to meet from these four different perspectives:

1. **Financial Perspective**—What financial measures do we want IT to achieve?

2. **Customer Perspective**—What do external and internal customers want from IT?

3. **Business Perspective**—What business processes must we excel at to accomplish the company's goals?

4. **Learning Perspective**—How do we continue to learn and improve our ability to accomplish our goals?

Brainstorm a large list of criteria under each of the four perspectives. Then review the lists and select four to eight of the most important performance criteria. If you can position IT to deliver capabilities that meet these criteria, the IT organization has accomplished its mission.

For instance, the CIO may define financial criteria such as build the new systems for X dollars and be able to operate them for Y dollars per year. Customer measures could track activities that provide customers with Web-based capabilities to do a range of activities such as look up products, enter orders, and pay bills. Business criteria track things such as how well systems handle a certain level of transactions per minute, how well they scale up to manage additional transaction volumes, and how quickly they can be learned by new users who need them to do their jobs. Learning measures demonstrate how well a system provides users with the data and reports they need to assess and improve their performance on an ongoing basis.

Next, look for ways to achieve these performance criteria in dramatically new ways. Ask the question, "What seems currently impossible, but

if it could be done, would dramatically change the way we do business?" Look for ways to use systems to change the business landscape, to give the enterprise a significant competitive advantage by doing something new and different.

Systems can be used to open up opportunities to either increase revenue or decrease costs. Systems can increase revenue by:

- Creating new distribution channels
- Erecting barriers to entry by competitors
- Reducing customers' ability to substitute another product for your product
- Helping the company anticipate and respond quickly to market demands

Systems can decrease costs by:

- Improving product quality
- Increasing production rates
- Decreasing production and operating costs

The ways in which systems accomplish these opportunities will either create structural change in the way an industry operates, or it will support and enhance traditional industry products and procedures. Great competitive advantages can be gained if ways are found to create structural change in an industry. This is what changes the business landscape; it is said that all you need to do is to be 10 percent new in any field to start a fortune. Companies that create structural change become leaders in their industries.

Remember, a system is always people, process, and technology—not just technology. Define and design the process first, and then put the people and technology into place to support it. At the same time, keep in mind the capabilities of the people and technology available, and design a process that is realistic given those capabilities. In other words, adjust your ends to your means. Good strategy starts with a clear understanding of what is possible.

One last point to remember about strategic IT projects is this: The executive sponsors on the business side need to remain actively involved with the project in an oversight and advisory role throughout the project's life cycle. If no senior managers take an interest in this role, then either the goals that the IT strategy addresses are not really that important to the

A FRAMEWORK FOR CLEAR THINKING

Before we go further let's define our terms. What exactly do we mean when we say strategy—especially in the context of the CIO's two main responsibilities? Strategy, tactics, goals, objectives, missions, and milestones—we often toss these words about in various vague, undisciplined, and confusing combinations. Most of the time terms such as goals and objectives or strategies and tactics are used interchangeably. The precise meaning of the words gets lost and so the clarity of thinking that these words can support is also lost.

If we hope to gain any real value from these words then we owe it to ourselves to be very precise and clear in the way we use them with both our executive peers and our staff members. Otherwise, they become trite phrases, macho imagery, or smokescreens for incompetence.

BUSINESS VISION—This is a statement of the company's purpose, why it exists, what it aspires to. The business vision of the company is articulated by a set of goals that define what the company will strive for and where the company will invest its resources.

GOAL (OR MISSION)— A goal is a *qualitative* statement that describes a state of affairs or an accomplishment necessary for the business to become what it wants to become (the business vision). An example of a goal is, "Excel at customer service to strengthen and grow the national accounts sales program." Another example would be, "Develop an e-business infrastructure to capitalize quickly on market trends."

STRATEGY— Strategy can be defined as simply, "the deliberate application of *means* to achieve business vision and goal-related *ends*". Strategy is the art of using the means—business capabilities—available to a company to achieve its ends—its business goals. The degree to which a strategy is effective depends on a clear understanding of what is possible. The purpose of strategy is to maximize possibilities for success by effective use of the means available to an organization. Strategies are used to coordinate the accomplishment of goals or missions.

OBJECTIVE (OR MILESTONE)—Unlike the business vision or a goal, an objective must be *quantitative*—it is a specific, measurable achievement necessary to accomplish a goal. The strategy that a business uses to accomplish a goal defines the objectives that must be achieved along the way. Objectives are the specific, measurable milestones that must be reached to accomplish a goal or mission. Objectives must be measurable; progress,

toward and achievement of objectives should be easily determined by use of appropriate metrics. An example of an objective is, "Increase sales in the healthcare sector this year by 15%."

PLAN—A plan is a non-repetitive set of tasks that leads to the achievement of a new objective. A plan is not to be confused with an operating schedule, which is a repetitive set of tasks that are used to perpetuate an already existing state of affairs. The situation, the objectives defined and the tactics being applied guide the creation of a plan. The sequence of tasks shown on the project plan reflects the tactics and techniques that are being used. (See Exhibit 1.1.)

TACTICS—Tactics are the execution and control of actions needed to carry out the business strategies and achieve objectives. Tactics effectively coordinate people, processes, and technology to achieve objectives that are defined by the business strategy. Tactics are the methods used to get things done.

TECHNIQUES—A technique is a well-defined action or behavior producing a pre-defined result. A technique is a systematic procedure by which a task is accomplished. Combining techniques into useful sequences creates tactics. See Exhibit 1.1 A Framework for Clear Thinking

business or people believe the strategy is flawed and doubt that the goals can be accomplished. In either case, you as the CIO should be aware of this. If that is the case, change your goals or your strategy if you want to remain part of senior management in your enterprise.

FORMULATING STRATEGY IN HIGH-CHANGE ENVIRONMENTS

Formulating IT strategy in the high-change, high-risk environments we live in today is an iterative process of definition and redefinition. Our enterprises may go through formal strategic planning cycles every three or four years, but every year in between and every quarter of each year CIOs must update and adjust their IT strategies to best respond to the way their world evolves. Gone are the days when IT strategies could be rigid, multi-year plans that laid out each activity in detail and then simply required people to do as they were told. People may actually be able to do the things they are

The **vision** of what the business wants to become is articulated by a set of **goals**.

The **goals** and the **strategies** to accomplish them are designed to make maximum use of the company's capabilities.

Business Vision

GOAL 1

GOAL 2

GOAL 3

Objective A

Objective B
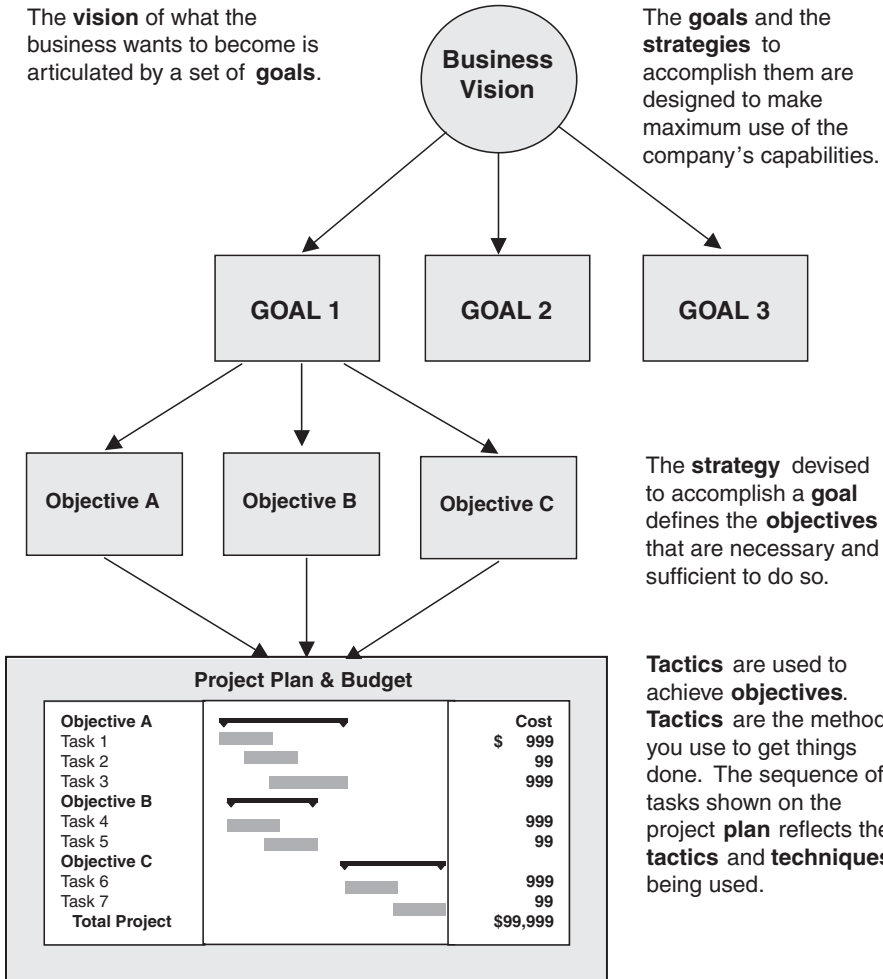
Objective C

The **strategy** devised to accomplish a **goal** defines the **objectives** that are necessary and sufficient to do so.

Project Plan & Budget

		Cost
Objective A		
Task 1		$ 999
Task 2		99
Task 3		999
Objective B		
Task 4		999
Task 5		99
Objective C		
Task 6		999
Task 7		99
Total Project		$99,999

Tactics are used to achieve **objectives**. **Tactics** are the methods you use to get things done. The sequence of tasks shown on the project **plan** reflects the **tactics** and **techniques** being used.

EXHIBIT 1.1 **A Framework for Clear Thinking**

told, but with rigid plans they inevitably find themselves performing tasks that no longer relate to the real world and the real needs of their enterprise.

The point to understand is that an enterprise's goals remain reasonably steady over a two to four year period but the IT strategies employed to accomplish those business goals may need to be changed every year or even more frequently. Like setting a ship's course, a strategy is a way of steering toward a goal—of getting from here to there. The real world unfolds in unexpected ways that may push you off your expected course so you make mid-course corrections (strategy corrections) as needed. But you are not

just flailing about because you are always steering the IT organization toward a steady destination (the business goals).

Therefore, the IT strategy formulation process has a sequence of four steps to guide people through the cycle (see Exhibit 1.2). These steps are:

1. Map out the big picture

2. Decide how to get from here to there

3. Act effectively to manage risk

4. Evaluate changes

Map out the big picture means literally creating a map that shows the territory in which your enterprise operates. Use the map to identify the facility locations of the enterprise at present and the locations that the company wants to open in the future. Usually the maps you create will be more than just geographical maps. The CIO also needs to create maps of the markets the company serves, maps that compare enterprise systems capabilities to competitors' capabilities, and maps that describe and compare the IT infrastructure of the enterprise and its competitors.[1] These maps, charts, diagrams, and lists define and identify where the enterprise is at present and where it wants to be in the future. This future destination is the destination that all IT strategies aim to reach. There can be no coherent strategy until people understand where they are trying to go.

Decide how to get from here to there means just that. Understand where you are at present and where you want to go. Then you can make calculations about how far you have to go. Also define the milestones or interim destinations along the way.

The past several decades of experience in the IT profession teaches CIOs not to attempt "big bang" strategies. These types of strategies try to move IT organizations directly from where they are to where they want to go in one mighty leap and they usually fail. Instead define a sequence of interim destinations that creates a path to follow to the desired final destination. Then make calculations for getting from where you are currently to the next interim destination on your path.

Act effectively to manage risk requires that a CIO makes sure the journey between these interim destinations can be accomplished in three- to nine-month steps and that each step produces value in its own right. An interim destination cannot be just some midway point that still requires

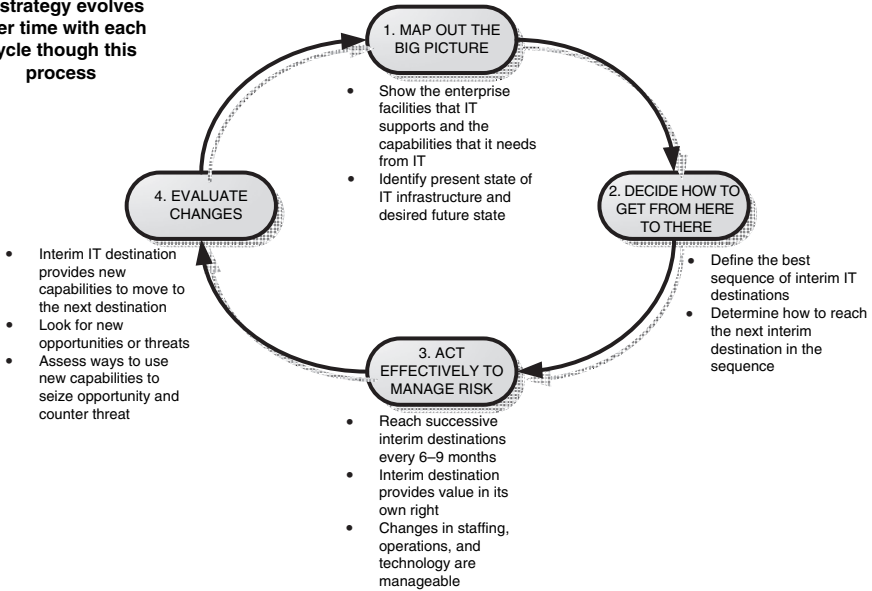**IT strategy evolves over time with each cycle though this process**

1. MAP OUT THE BIG PICTURE

- Show the enterprise facilities that IT supports and the capabilities that it needs from IT
- Identify present state of IT infrastructure and desired future state

2. DECIDE HOW TO GET FROM HERE TO THERE

- Define the best sequence of interim IT destinations
- Determine how to reach the next interim destination in the sequence

3. ACT EFFECTIVELY TO MANAGE RISK

- Reach successive interim destinations every 6–9 months
- Interim destination provides value in its own right
- Changes in staffing, operations, and technology are manageable

4. EVALUATE CHANGES

- Interim IT destination provides new capabilities to move to the next destination
- Look for new opportunities or threats
- Assess ways to use new capabilities to seize opportunity and counter threat

EXHIBIT 1.2   **Four Steps to Strategy Formulation**

more work in order to be of any tangible value. In the context of IT this means that the interim destination must be a functioning system or operating process, not just an analysis document or a set of specifications. The system delivered at an interim destination must be able to go into production and begin repaying the cost of the work to produce it.

Design each three- to nine-month step so that changes in staffing, operations, and technology are affordable and manageable. Remember that systems are people, procedures, and technology combined in a coordinated way. Do not attempt changes in these three areas that are beyond the capability and capacity of your organization. Be honest about what is possible and what is probable.

Evaluate changes happens upon completion of each three- to nine-month step. The interim destination at the end of each step provides a base from which to take the next step but does not lock the IT organization into any rigid, preset sequence of next steps. The world will probably have changed in the past three to nine months. Take the opportunity to pause for a moment and check out the lay of the land again.

Reaching an interim destination gives the CIO a new position and new

capabilities. How can you best use this position and your new capabilities to capitalize on the opportunities that change may have brought your way? Or you can consider how best to counter a threat that just emerged. Either way, make decisions in light of the need to continue steering the IT organization toward delivering the capabilities needed by the enterprise to reach its stated goals.

STRATEGIC GUIDELINES FOR DESIGNING IT SYSTEMS

System designs reflect the IT strategies being used to enable the enterprise to achieve its performance targets. Good strategies and good system designs are two sides of the same coin. All system designs are not created equal. Some designs and the strategies they support are clearly superior to others, and there is an objective way to identify these superior designs.

This section discusses seven guidelines for designing systems that reflect IT strategies (see Exhibit 1.3). The best system designs follow all seven of these guidelines. A passable design can ignore one of them as long as it isn't the first guideline. However, any design that disregards more than two of these guidelines is fatally flawed and will lead to failure.[2] The seven guidelines are discussed in the following sections.

Positive Guidelines

Guideline 1: Closely align systems projects with business goals.   For any systems development project to be a success it must directly support the company to achieve one or more of its goals. No new system can be effective until the CIO has first identified or created the business opportunity that will make the system worth building, and no new system will bring any sustained benefit to the company unless it supports the efficient exploitation of the business opportunity it was built to address.

Guideline 2: Use systems to change the competitive landscape.   Look for tasks and activities that seem impossible today, but if they could be done, would fundamentally and positively change the ways the enterprise does business. Put yourself in your customers' shoes. In the words of the Nordstrom's motto, think of what would "surprise and delight" your customers. Look for opportunities to create a transformation or value shift

POSITIVE

1. Closely align systems development projects with business goals and specific performance targets.

2. Use systems to change the business landscape.

3. Leverage the strengths of existing systems.

4. Use the simplest possible combination of technology and process to achieve the maximum number of objectives.

5. Structure the design so as to provide flexibility in the development sequence used to create the system.

NEGATIVE

6. Do not try to build a system whose complexity exceeds the organization's abilities to support it.

7. Do not renew a project using the same organization or the same system design after it has once failed.

EXHIBIT 1.3   Strategic Guidelines for Designing Systems

in your market. Find ways to do things that provide dramatic cost savings or productivity increases. Then place yourself in your competitor's shoes and think of what course would be the least likely to be foreseen or quickly countered or copied. As long as you are able to do something of value that your competitors cannot, you have an advantage.

Guideline 3: Leverage the strengths of existing systems.   System design embodies strategy. When existing systems have proven to be stable and responsive over time, find ways to incorporate them into the design of new systems. The purpose of strategy is to use the means available to the organization to best accomplish its goal. Build new systems on the strengths of older systems. Nature uses the same principle in the evolutionary process. New systems provide value only insofar as they provide new business capabilities. Time spent replacing old systems with new systems that do essentially the same things will not, as a general rule, provide enough value to justify the cost.[3]

Guideline 4: Use the simplest combination of technology and business procedures to achieve as many different objectives as possible. A simple mix of technology and process that can achieve several different objectives increases the probability that these objectives can actually be achieved. This simple mix reduces the complexity and the risk associated with the work and spreads the cost across multiple objectives. Using a different technology or process to achieve each different project objective multiplies the cost and the complexity and reduces the overall probability of project success.

Guideline 5: Structure the design so as to provide flexibility in the development sequence used to create the system. Break the system design into separate components or objectives, and whenever possible, run the work on individual objectives in parallel. Try to prevent the achievement of one objective from becoming dependent on the achievement of another objective. In this way, delays in the work toward one objective will not impact the progress toward other objectives. Use people on the project who have skills that can be applied to achieve a variety of different objectives. Using the same technology to achieve several different objectives makes it much easier to shift people from one objective to another as needed because they use the same skill sets. The project plan should foresee and provide for an alternative plan in case of failure or delays in achieving objectives as scheduled. The design of the system you build should allow you to cut some system features if needed and still be able to deliver solid value to the business.

Negative Guidelines

Guideline 6: Do not try to build a system with a level of complexity that exceeds the organization's capabilities. The beginning of wisdom is a sense of what is possible. When defining enterprise goals and the systems to reach those goals, aim for things that are within reach. Set challenging goals but not hopeless goals. The people in the IT organization need to have confidence in themselves in order to rise to a challenge. Avoid exhausting their confidence in vain efforts to reach unrealistic goals.

Guideline 7: Do not renew a project using the same organizational approach or the same system design after it has once failed. Re-doubled

hard work and effort are an inadequate response for ensuring the success of a project after it has once failed. People are usually demoralized after the first failure and will not rise to the challenge of doing the work again unless there are meaningful changes in the project approach. The new approach must clearly reflect what was learned from the previous failure and offer a better way to achieve the project objectives.

Using these Guidelines: A Real-World IT Strategy

For six years I was the CIO of a member-owned, national distribution cooperative named Network Services Company (NSC) that served customers such as national restaurant chains, national property management companies, and healthcare companies. NSC provided products and supply chain services related to food service disposables, janitorial and sanitary supplies, and printing paper.

The strategic use of IT resulted in significantly increased sales revenues by enabling the company to enter several new markets. It also reduced operating expenses and provided the internal productivity needed to handle the business growth with only minor increases in staffing levels.

During a four-year period the company's operating model went from almost no electronic commerce except for a little EDI activity to most of its revenue coming in as electronic transactions—from customer order entry to final invoice payments. During this time the company's revenue more than doubled and customers began requiring supply chain services they had never asked for in the past. We had to find new ways of operating if the company was to survive and thrive. This necessity brings out the CIO's resourcefulness and creativity, two essential components of good strategy.

Resourcefulness demands that the CIO work more efficiently and take new approaches. Sustainable creativity requires the discipline to adhere to the seven strategic guidelines mentioned earlier. Otherwise creativity becomes an end in itself, and it can take a CIO on fantastic voyages and flights of fancy that have no chance of success. The past 20 years of business are littered with highly creative, yet strategically irrelevant uses of IT that never achieved success.

NSC retained a prestigious management-consulting firm to assist in its strategic planning exercise. This exercise identified five goals for the business

and suggested some strategies for accomplishing these goals. One of the business goals was to develop the e-business systems infrastructure needed to further integrate the member companies into the cooperative organization and allow NSC to better serve national account customers.

At the end of the strategic planning process, the consulting firm very strongly recommended that we build and operate our own state-of-the-art, Web-based, order entry and product catalog system. They offered to begin work on it immediately. That was what everyone else was doing at the time. It is what our biggest competitors were doing. I, however, strongly advised against this course of action because it violated four of the seven strategic guidelines.

The first guideline this approach violated was, "Use systems to change the competitive landscape." Web-based order entry systems were already in use by our competitors and it wasn't clear how much immediate demand there really was for them. It would only be a catch-up or a "me too" move on our part and yet, at the time, would have required the bulk of our IT development budget to build our own system. It seemed far more consistent with this guideline to make our major effort and expenditure in a different area that gave us potential to acquire new business capabilities not then possessed by our competitors.

The next guideline this approach violated was, "Leverage the strengths of existing systems." Web-based order entry systems were already available from e-commerce service providers who would let us lease the use of their systems for a small per-transaction fee and a modest up-front cost to get started.

Another violated guideline was, "Use simple combinations of technology and business procedures to meet the system's performance requirements." Building and operating our own Web-based order entry and catalog system meant a significant amount of technical complexity, and it was much simpler to use an e-commerce service provider for this.

"Do not try to build a system with a level of complexity that exceeds the organization's ability to support it" was the fourth guideline ignored by this advice. Initially, NSC had a relatively small IT group that focused on supporting a basic set of business systems running on a mid-range IBM computer. There were also a few people devoted to supporting e-mail, a simple Web site, and office productivity software running on a local area network. The sudden leap from what then existed to an expanded IT staff

and state-of-the-art systems infrastructure operating 24/7 in real time over the Internet was clearly beyond the capability of the company to do all at once. It was better to grow into this over time.

So I used the seven guidelines to facilitate a process of selecting and combining different ideas until a truly resourceful and creative IT strategy emerged. The strategy called for construction of a suite of four systems that each provided value in their own right and worked together to deliver an e-business infrastructure with the performance capabilities we needed.

Those systems were built with a mixture of simple technology and off-the-shelf software packages. As a consequence, we spent only a fraction of what our competitors did. The first version of our e-business infrastructure was up and running in nine months, whereas our competitors took much longer to get their infrastructure in place. The four systems were:

1. *A computing and communications infrastructure and data center* to run the e-business systems and provide a virtual private network (VPN) to ensure data security for people using the systems.

2. *An enhanced Web site (Web portal)* with a link to an outside service provider for Web-based order entry and an internally developed sales history reporting system for use by customers.

3. *A data warehouse* to store and retrieve data needed by the sales history reporting system and to support our internal business intelligence needs.

4. *An Internet-based data delivery system* to provide electronic, two-way data transfer between the different computer systems of our members, customers, and suppliers. We named this system "NetLink-NSC"™.

In the following years we continued to enhance these systems with new features as needed. We used the capabilities these systems provided to form supply chain partnerships with new and existing national account customers. These systems allowed us to work cooperatively with them to lower their overall cost of purchasing and using our products without requiring us to just reduce prices on the items we sold them. The company was able to command slightly higher gross margins than its competitors because customers were willing to pay a bit more in order to get the

customized bundle of value-added services that we could provide them thanks to the IT infrastructure we developed.

This strategy was particularly successful in growing the business in a new vertical market segments. One segment was the national building service contractor (BSC) market. These are companies that contract with property managers to clean office buildings, shopping malls, healthcare facilities—a very fragmented market that was consolidating into national chains.

Our systems provided BSC customers with both e-procurement capabilities and daily updated sales history reporting. Their managers could get online reports that showed consumption of supplies by job site, by product, and by manufacturer over any time period they specified. Our e-business systems provided customers with key tools that allowed them to manage operating expenses and realize the economies of scale that supported their profit margins. By partnering with us, customers avoided the expense of building their own supply chain management systems.

I structured the development and rollout of these systems into phases that each took three to nine months, as shown in Exhibit 1.4. Each phase created a set of production subsystems that became the basis upon which to build further subsystems or enhancements. As these phases were completed, we were able to take stock of the changes in our markets and respond appropriately to opportunities as they presented themselves.

MATCH STRATEGY EXECUTION TO THE TEMPO OF YOUR BUSINESS

Just as farmers and people who make their living from the land have a rhythm to their lives that is set by the four seasons, so too do corporate CIOs (whether they know it or not). Instead of the four seasons we in business have the four quarters. Each quarter has its demands and opportunities. Like good farmers who prosper by responding appropriately to each season, effective CIOs make the best use of the opportunities and risks presented by each quarter if they are to prosper.

The rhythm of the quarters isn't quite as well defined as the rhythm of the seasons, but there is a certain tempo in each quarter's activities for most enterprises. The first quarter's tempo is quick—get out of the gate and get started on the year's major development projects. The second
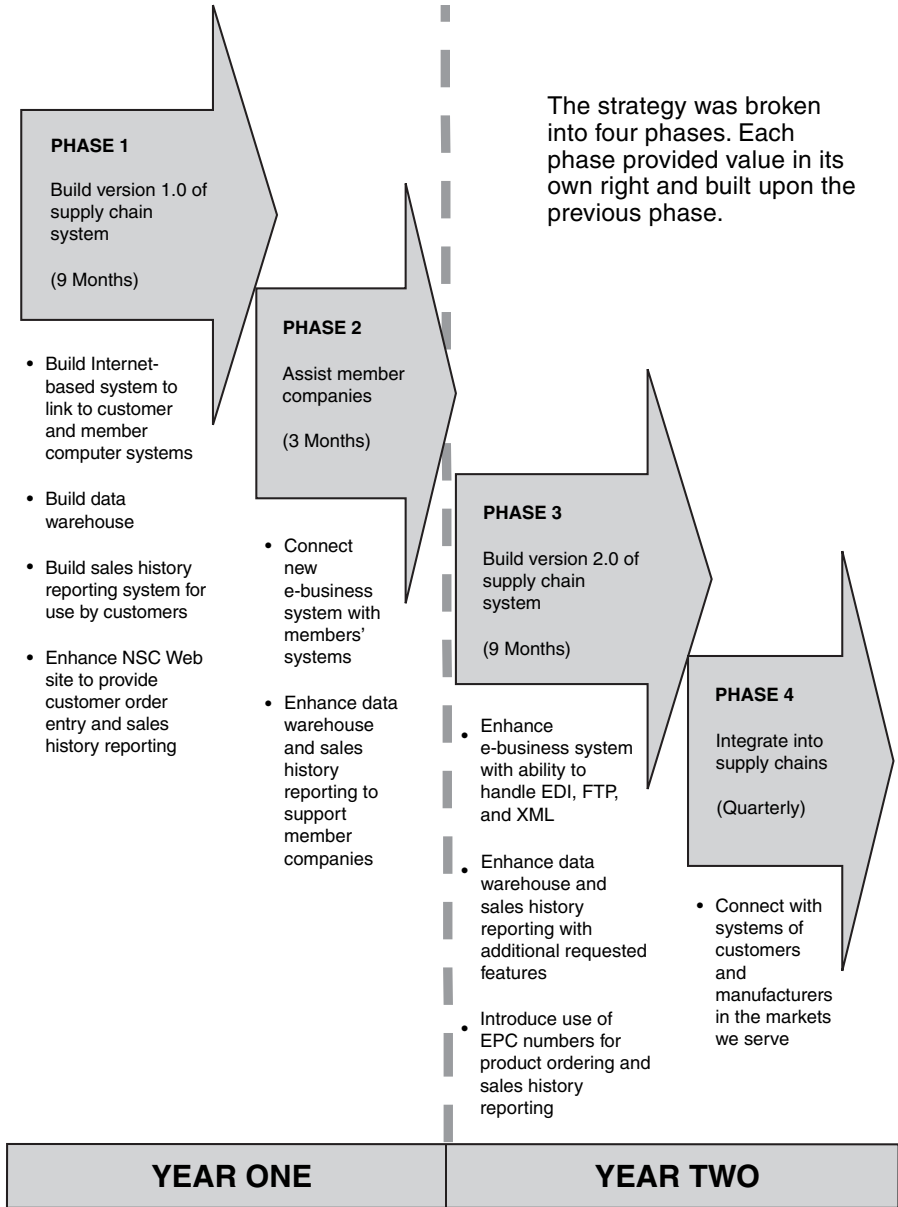
PHASE 1

Build version 1.0 of supply chain system

(9 Months)

- Build Internet-based system to link to customer and member computer systems

- Build data warehouse

- Build sales history reporting system for use by customers

- Enhance NSC Web site to provide customer order entry and sales history reporting

PHASE 2

Assist member companies

(3 Months)

- Connect new e-business system with members' systems

- Enhance data warehouse and sales history reporting to support member companies

PHASE 3

Build version 2.0 of supply chain system

(9 Months)

- Enhance e-business system with ability to handle EDI, FTP, and XML

- Enhance data warehouse and sales history reporting with additional requested features

- Introduce use of EPC numbers for product ordering and sales history reporting

PHASE 4

Integrate into supply chains

(Quarterly)

- Connect with systems of customers and manufacturers in the markets we serve

The strategy was broken into four phases. Each phase provided value in its own right and built upon the previous phase.

YEAR ONE	YEAR TWO

EXHIBIT 1.4 **Supply Chain Systems Development Strategy**

quarter's tempo is more measured—to achieve the first round of project milestones and make any needed mid-course corrections. In the third quarter, work on the new systems and enhancements needs to be completed and put into production. In the fourth quarter the successful CIO reaps the benefits of a good harvest and begins planning projects for the coming year.

In the first quarter, the CIO has 30 days to finalize IT project selection agreements with business executives. That means understanding the business strategy and the IT alignment needed to support that strategy. In the last 60 days of the first quarter the CIO needs to see to it that project teams of qualified people are assigned to each finalized project and that they get off to a fast start.

Each team has to understand the business goals of their project and define the performance requirements for the system they will build. The team comes up with a conceptual system design showing high-level business processes and the technology they will use to support those processes. They also do an ROI analysis and adjust their conceptual design as required so that the cost of the system doesn't exceed the value of the benefits it will deliver. Although the CIO may not actually do all this work, the CIO still provides guidance and makes sure it gets done in a timely fashion.

In the second quarter project teams flesh out their conceptual system designs and prototype the system user interfaces and technical architectures. A prototype either verifies a system will work as expected or the system has to be rethought and prototyped again. Then the team produces a set of detailed design specifications to build the system. Those design specs are the workflow process maps, the system data model, the user interface, and the system technical architecture. The CIO should watch this process like a hawk. The CIO guides, assists, and cajoles the teams as necessary to keep them on track and on time.

By way of analogy, when farmers in the American Midwest talk about their corn crop they say, "It needs to be knee-high by the fourth of July." If it isn't, there's not much hope of a good harvest in the fall. If project teams haven't finished their detailed system design specs by the end of the second quarter, there isn't much hope that they can deliver anything by the end of the third quarter or even the fourth quarter.

In the third quarter the project teams focus on building their systems. By

the end of the third quarter the first versions of the new systems and business processes should be rolling out to people who will use them. If this isn't happening by the end of the third quarter, there won't be any rewards for the CIO to reap in the fourth quarter.

In the fourth quarter the CIO assesses the impact of the new systems and begins discussions with fellow business executives about next year. The CIO needs to produce a good harvest of system deliverables in the current year so that people feel good about fully funding an IT budget proposal for the year to come.[4]

TACTICS ARE THE METHODS THAT GET THINGS DONE

Once strategy has been defined, the game is all about tactics. The execution of any strategy depends on the effective use of tactics. Our profession has had enough experience by now to know that there is a right way to run projects, and the CIO is responsible for ensuring that development teams use appropriate tactics. Every CIO should understand and use a short list of six tactical principles. These principles apply whenever the CIO and IT organization perform development work to deliver a new system or enhance an existing system.

Appropriate project tactics follow these six principles, and there is no convincing reason to violate any of them. Follow these principles and you can tailor specific tactics for any project and enjoy consistently good results. Ignore any one of them and you undermine the effectiveness of the others—so use them all.

Principle 1. Every project needs a full-time leader with overall responsibility and the appropriate authority—the system builder.

There must be a single person responsible for the project's success who is totally focused on getting the job done. This person must also have the authority within the project to make decisions and act quickly without having to get permission from senior management. System builders always appreciate having the backup of a steering committee or management oversight group to which they report, but a committee cannot make decisions in a timely manner. If a qualified system builder is not in

place, the progress and cost of the project will reflect the absence of such a person—progress will be slow and costs will be high.

Principle 2. Define a set of measurable and non-overlapping objectives that are necessary and sufficient to accomplish the project goal or mission.

It is crucial that the CIO and the ststem builders define clear project objectives so that the people who are assigned the responsibility to achieve these objectives know what is expected of them. It is very important that the boundaries of these objectives do not overlap because if they do, the overlap will cause confusion and conflict between the teams assigned to achieve these overlapping objectives.

Make sure each objective is absolutely necessary to the accomplishment of the project goal. Do not pursue an objective just because it seems like a good idea. Finally, when all the objectives have been achieved, that must be sufficient to accomplish the mission or the goal set by the *CIO*. The set of objectives must cover everything that needs to happen.

Principle 3. Assign project objectives to teams of 2–7 people with hands-on team leaders and the appropriate mix of business and technical skills.

Put together a project team of two to seven people who in your judgment have among them the necessary business and technical skills and experience to address the issues that you expect to arise in achieving the objectives you delegate to them. A team is a self-organizing group of people with complementary skills such that all members contribute their strengths without being penalized for their weaknesses. Each member of the team concentrates on the aspects of designing and building the system that they are best at and/or most interested in.

A properly configured team enables the team leader to delegate tasks to people who are interested in these tasks. People spend most or all of their time doing tasks they are interested in and little or no time doing tasks they are not interested in. Within a team, the operative word is "we", not "me". The whole team is rewarded for successes and takes responsibility for mistakes. Singling out superstars or scapegoats undermines team morale and performance.

Principle 4. Tell the teams WHAT to do but not HOW to do it.

Point a project team in the right direction by giving them a well-defined project goal and clearly identify the project objectives for which they are responsible. The objectives define the outcomes that they must deliver to be successful. The project goal and the objectives that the CIO delegates to a team define the game that the team should play. The team itself must then go through the process of creating their plan to achieve the objectives that the CIO has defined for them.

General Patton said, "Tell people what you want but don't tell them how to do it—you will be surprised by their resourcefulness in accomplishing their tasks." The teams can make changes or additions to the objectives they are given as long as you and they agree that the modified objectives are still necessary and sufficient to accomplish the project goal.

Principle 5. Break project work into tasks that are each a week or less in duration and produce something of value to the business every 30–90 days.

Encourage project teams to structure their project plans so that each task can be accomplished within a week or less and has a well-defined deliverable. Track these tasks as either started, delayed, or finished. Do not fall into the trap of tracking tasks by their percentage of completion because it is unclear what "percent complete" really means. A task is either started or not; if started it is either completed or delayed; and completion occurs when the task deliverable has ben created.

The system builder must be able to track progress at the task level of detail in order to keep accurate projections of the time to complete and the cost to complete for each of the project's objectives. Multi-week tasks make progress hard to measure, and they are the ones that suddenly surprise the system builder. Multi-week tasks reported by the percent complete method often seem to show good progress, but then in the last week they suddenly turn out to be nowhere near completion.

Project tasks should combine to produce something that is of value to the enterprise every 30 to 90 days. This provides the opportunity for the business to verify that the project is on the right track. It also provides subsystems that the business can start to use even before the entire project is completed and begin to see some return on the cost of the project.

Principle 6. Every project needs project office staff to work with the system builder and team leaders to update plans and budgets.

The project plan and budget are analogous to the profit and loss statements for an enterprise. They must be updated continuously and accurately in order to provide the people running the project with the information they need to make good decisions. There is a common but misguided notion that the system builder and team leaders should be the ones who keep the plans updated. This is analogous to the idea that the president of a company and its managers should spend their time keeping the enterprise's books.

Just as there is an accounting department to keep the enterprise's books, there needs to be a project office group that keeps the project's plans and budgets current. The project office staff reports to the system builder and works with the team leaders on a weekly basis to review and update the plans and budgets associated with each team objective. In this way the system builder can accurately monitor project progress and the team leaders are able to focus on running their teams rather than filling out reports (see Exhibit 1.5).

PART 2
GETTING THINGS DONE AND DELIVERING VALUE

The hallmark of successful CIOs is that year after year they consistently get things done and deliver value to the enterprises that employ them. These successful CIOs have in common a handful of characteristics. The short list here comes from my own experience and from talking with and reading about other CIOs over the past 20 years. If you feel I have left out an important activity I invite you to contact me (my e-mail address is mhugos @yahoo.com). My short list contains these activities:

- Illustrate and quantify the IT strategy
- Communicate constantly
- Explain and train
- Use a participatory decision-making process
- Master the "operational art"
- Know the difference between boldness and recklessness

1. Every project needs a full-time leader with overall responsibility and authority.

2. Define a set of measurable and non-overlapping objectives that are necessary and sufficient to accomplish the project goal or mission.

3. Assign project objectives to teams of 2–7 people with hands-on team leaders and the appropriate mix of business and technical skills.

4. Tell the teams WHAT to do but not HOW to do it.

5. Break project work into tasks that are each a week or less in duration and produce something of value to the business every 30–90 days.

6. Provide project office staff to work with the project leader and team leaders to update plans and budgets.

EXHIBIT I.5   Tactical Principles for Running Projects

Illustrate and Quantify the IT Strategy

A strategy is not worth much if people do not understand it. One of the main purposes of strategy is to provide a common framework that everyone can use to organize their activities and visualize how their own actions move the company toward its stated goals. People need to see how the strategy translates into a believable sequence of steps that gets the enterprise closer to its goals.

The best way to do this is with charts and diagrams. Something is wrong with either your strategic understanding or with the strategy itself if you cannot illustrate it in a few clear diagrams. The next two exhibits illustrate and quantify an IT strategy that could have been used at NSC to move the company toward its new business model. Exhibit 1.6 shows how the four e-business systems components would develop from existing IT infrastructure and evolve over several years. Exhibit 1.7 shows more detail to illustrate the activities in a particular year. It also quantifies the timelines and budgets for development projects in the second year of this proposed strategy.

Phase 1	Phase 2	Phase 3	Phase 4
Build supply chain & e-business systems	Assist Members	Enhance Links to Customers, Suppliers, & Members	Integrated Supply Chains

Existing IT infrastructure

NSC Web O/E

Mbr Web O/E

Web, EDI, FTP, XML

NMS → NetLink Ver. 1 → NetLink Ver. 2

Sales Rpts → Data Whse Ver. 1 → Mbr Data Whse → Data Whse Ver. 2

Old Web Site → New Web Site → NSC Internet Portal

New Part #s & EPC #s

Year 1	Year 2	Year 3

E X H I B I T 1 . 6   **Phases of IT Strategy and Systems**

	Qtr 1	Qtr 2	Qtr 3	Qtr 4

NETLINK UPGRADES
Routing of all incoming POs to NetLink from EDI, buy sites, etc. Automated operation, XML and FTP capabilities
$999,999
IT Project Team "A"

EDI UPGRADE
Install new package and automate operations
$99,999
EDI Support Group

ENHANCEMENTS TO SALES HISTORY REPORTING
Flexible roll up logic defined by customer, more report formats
$999,999
IT Project Team "B"

NEW NSC PART NUMBERS
Re-engineer the NSC part numbering system. Make part numbers vendor specific, provide one-to-one translation between NSC and members part numbers, maintain computerized translation tables.
$999,999
IT & Inventory Mgmt Team

AR / AP ENHANCEMENTS
Other modifications requested
$99,999
System Vendor

ASSIST MEMBERS USING TIBERSOFT FOR LOCAL CUSTOMERS
Work with members to help set up their product catalogs and prices on Web O/E via NetLink
$99,999
IT & Customer Service Team

TRANSITION MEMBER COMPANIES TO NETLINK FROM NMS
Work with members to help them set up NetLink in their companies
$99,999
IT & Customer Service Team

RE-WRITE REBATE SYSTEM
Re-engineer data collection process and re-write system
$999,999
IT & Product Mgmt Team

DATA WAREHOUSE INFORMATION ACCESS
Enhance data whse and train NSC staff to access data they need for their work
$999,999
IT Project Team "C"

E X H I B I T 1 . 7   **Timelines and Budgets for Year Two**

The actual strategy used by NSC was different from the one depicted in these exhibits. The point is that, as CIO, I was able to play an important role in shaping the company's strategy by presenting my ideas in this kind of graphic format. This format allows people to quickly grasp the essential outline of a proposed strategy, and it facilitates productive discussions about possible modifications or alternative strategies.

Note that the phases of this proposed strategy are each three- to nine-months long. Good IT strategies deliver tangible benefits within time frames like this. Note also that each phase builds upon the deliverables of the previous phase to continue to build out the systems infrastructure needed to support the enterprise's changing business model.

Communicate Constantly

After illustrating and quantifying the IT strategy it becomes the CIO's message to the world—a message to be communicated constantly to a range of different audiences. When you do this job well you begin to feel like a candidate running for elected office because in a sense you are. You must solicit the approval of enough people to make your strategy a reality.

The execution of strategy is all about getting things done. And to get things done you need the active cooperation and participation of a lot of people, all of whom have slightly different agendas. The CIO must constantly explain what is in the IT strategy for them and why they should actively, vocally support the IT strategy.

The CIO also listens to people's responses and makes adjustments to IT strategy when necessary. Remember that the business goal (the destination) usually remains steady over a two- to four-year period but the way to reach that goal (the strategy) can change as the situation unfolds. Listening to how people respond to your message is the other half of sound communication. The message needs to evolve so that people buy into it. They buy in and become supporters of your strategy when they know you are listening to what they have to say.

Explain and Train

Inside the universe of groups with which the CIO communicates, a smaller subset of people either builds or uses the systems called for by IT strategy. The CIO must pay even more focused attention to these groups.

With these people the CIO moves beyond communicating the strategy and listening to feedback. Spend considerable time one-on-one and in small group settings explaining the details of the tactics being used and why those tactics can deliver success, and make sure people get the training they need so they can perform the tasks that the tactics demand of them.

People want to be part of a winning project. They want to understand how the work will be done (the tactics being used). When they understand the tactics and believe those tactics can bring success they buy into the project wholeheartedly. Then the CIO steps back and lets them do their jobs. When people do not buy into a project they require constant supervision and cajoling to get anything done. An unwillingness to participate also tells you something very important. It tells you that your tactics may well be flawed.

Remember, tactics are composed of sequences of techniques. Every job and profession has a core set of techniques; in the IT profession some of the core techniques are process mapping, data modeling, and object-oriented design and programming (see more about these core techniques in Chapter 3). Make sure you know what techniques are required for the tactics you use, and make sure people receive adequate training in those techniques.

Use a Participatory Decision-Making Process

CIO leadership styles are judged by the decision-making processes they use. The more open a CIO's decision-making process, the more opportunity to get the commitment and active participation of those who will actually do the work. If done effectively, an open decision-making process is an extension of the communication, explanation, and training you provide.

The CIO, however, remains ultimately responsible for setting and carrying out the IT strategy, and some decisions need to be made by the CIO alone. People expect the CIO to make the tough calls when there is no consensus among lieutenants, when there is not enough information, and when time is short. But otherwise people do not like dictators.

The best, most competent people in particular, want an active voice in the decision-making process. As the leader of the decision-making process, the CIO's role is to see that timely and accurate information is available and that people get a chance to examine it, ask questions, and voice their

opinions. The CIO's role is to ask questions that focus people's attention on the important issues. Keep people from wandering off subject, bemoaning past mistakes, and discussing personalities instead of issues. When the CIO acts as a participatory leader, consensus decisions usually emerge that combine the collective wisdom of the entire management team. Encourage people to take ownership of their decisions and act on them without your constant oversight.

In my experience there are five elements that create an effective decision-making process. They must all be present because their cumulative effect produces the best participatory decision-making process. Those five elements are:

1. A functioning project management office (PMO)
2. Relevant data displayed in easily understandable "dashboard" summaries
3. Regular weekly meetings
4. Obligation to dissent
5. Trust

Much has been said and written about the need for a project management office or PMO. In actual practice many IT organizations pay lip service to the idea and do not have full-time qualified staff devoted to the PMO. They expect already overworked project leaders to also do the work of the project office. The PMO provides weekly updated project plans and budgets as well as accurate reports of operating expenses to date. As discussed in the section on the six tactical principles for running projects, these activities are a full-time job. Expecting project leaders to do this in their spare time is like expecting business unit managers to also do the business unit's bookkeeping and accounting in their spare time.

Dashboards are a way of displaying the most important information about a project in a layout that can be quickly scanned and understood by everyone, not just data analysts, engineers, or accountants. Project leaders should not be overloaded with detailed data or have to spend the time and effort reading through reports and piecing together data just to get a clear picture of what is happening. By way of an analogy, a racecar driver needs a quick display of the car's key performance indicators, not a detailed dump of engine statistics.

Regular weekly meetings are the forums where project leaders responsible for implementing IT strategy come together, review up-to-date project plans, budgets, and dashboards, and make decisions. The CIO has frequent informal, one-to-one meetings throughout the week with individual project leaders, but projects also need regular full group meetings so that everyone can stay current with the big picture and understand how their individual projects combine to enable effective execution of the full IT strategy.

The CIO sets the tone and the pace of these regular meetings. The tone must be positive, focused on issues not personalities. Everyone must feel empowered to voice their opinions and share their ideas. The pace of these meetings should be brisk. These are not leisurely (or boring) recitations of routine reports. The CIO focuses discussion on important issues with the aim of making decisions and taking action. If not much has happened in a given week the meeting can be short. If much has happened, the meeting is longer. Attendance is mandatory because the group only discusses serious issues and everyone lives by the decisions made at these meetings.

Leaders who really want the benefits of a participatory decision-making process encourage and respect the obligation to dissent. I tell my own staff that part of their job is to make sure I don't go off on a tear and do something stupid. That means they need to speak up if they see something I miss. I may be so focused on one aspect of a situation or so in love with some idea that I miss something that could lead to serious trouble.

This concept is put to good use by organizations such as the U.S. Marine Corps.[5] These organizations have learned over time that only a frank discussion of issues and options can consistently produce competent results. Decisions lose consistency when people believe that their role is merely to keep their opinions to themselves and rubber stamp whatever the boss thinks is a good idea. If that is the case, lots of bad ideas will find their way into actions that only lead to failure.

Trust is the glue that holds any group together—a glue that is hard to create and very easy to destroy. People speak up when they trust they will not be penalized. People follow a leader when they trust that the leader will not set them up to fail. Leaders get things done because they delegate authority and resources to people they trust to do the jobs that need to be done.

When trust breaks down action grinds to a halt. Nobody makes a move without first getting written permission. Nobody grants permission without first doing a full investigation. Matters soon deteriorate into superficial public posturing and conspiratorial whispering in private. Everyone becomes afraid of being made into a sacrificial victim to atone for the mounting list of failures that inevitably result from the breakdown of trust.

Master the "Operational Art"

Strategy is about defining a way to reach a desired destination. Tactics are about competently executing your chosen projects. Somewhere between high strategy and the tactical details embedded in the operations of any particular project lies that place where you must first choose your projects. This is a place where the CIO learns to see opportunities and risks from an operational perspective and develop an appreciation of their potential.

CIOs can choose from many potential projects to implement their strategies, but how do they select the project with the best strategic fit? Time teaches successful CIOs how to master this operational art. Mastering the operational art has been described as "knowing when a tactical move can deliver strategic results."[6] Effective CIOs develop a keen sense of the operational art. They see opportunities to employ available means to achieve breakthrough results. Where others see only obstacles, masters of the operational art see openings.

To illustrate this, I once worked for a company that had just won a contract with an important new customer. But to get the contract we lowered our prices and agreed to a 12-month contract term instead of the three-year term we usually requested. We also agreed to only a portion of the customer's business because they had already awarded the other portion to one of our competitors. By playing us off against our competition, they wanted to see how we both performed before awarding a longer exclusive contract to either of us.

At a senior management meeting one day we heard that this new customer was showing up on the slow pay list. They had agreed to pay us within 15 days, but were actually taking from 45 to 60 days in some cases. We knew they were not a credit risk, so why were they taking so long to pay? It impacted our cash flow, increased borrowing against our bank line of credit, tied up collections staff, and further lowered profitability on the account.

Upon hearing this the CFO said the customer had violated the terms of their contract and they should either pay all of their past due amounts right away or he was going to put them on credit hold and we would not ship them any more product. The sales VP protested the harshness of that recommendation and began arguing for extended credit terms.

He said part of the problem was that the customer's line managers who ordered our products had to personally review all our paper invoices and type them into their accounts payable system before they could be paid. Many of those managers were so busy handling their rapidly growing business that they sometimes had to work evenings and weekends just to complete administrative tasks like approving our invoices.

I saw an opening. I saw an opportunity to use our IT capabilities to provide a service that would help the customer streamline their ordering, receiving, and payment process. I saw a way to increase their managers' productivity, differentiate us from our competitor, and help us win all their business without having to further drop our prices. What was this opportunity?

By using our EDI system we could send them electronic invoices that arrived before our delivery trucks. The electronic invoices would be automatically imported into their payables system. Then their managers could call up our invoices on their system and check off line items as they unpacked our shipments. If everything was consistent, the press of a button released the invoice for payment. If there were problems we would learn about them sooner and could fix them faster. Once this new receiving process was in place we could then move on to provide the customer's managers with our online product catalog and order entry system to speed up the ordering process and further reduce errors.

Implementing this idea cost me no more money than what was already in my operating budget. The customer liked the idea. We had a pilot program up and running within 60 days. The customer began to see us as a true business partner and not just an anonymous supplier.

CIO Risk: Know the Difference Between Boldness and Recklessness

In my own experience and in talking to and reading the works of people who know even more than I do, I find that boldness is based on the ability

to understand the difference between a smart, calculated risk and a foolish gamble. A smart, calculated risk is an action that is not a certain success but one that has potential to deliver extraordinary rewards compared to the risks taken. A foolish gamble is one that delivers a small reward at the cost of risks bearing dire consequences.

CIOs need to clearly understand the potential upside of a project in comparison to the magnitude of its downside. Unless there is literally nothing to lose, never take a risk where the magnitude of the downside could overwhelm your ability to recover and exit from the situation intact enough to try again another day.

To illustrate, let me relate the story of the "great generator gamble". I have run the IT operations at several companies. I was once in charge of the IT group at a company where the CEO had gone on a tear about cutting expenses. He denied requests from managers to replace broken office lamps, he checked to see that people booked tickets on the cheapest airlines, and he began micromanaging everyone's operating budgets.

One hot summer day we experienced power brownouts in the office park where we worked. Then suddenly the power went off altogether and the building went dark and quiet. The computer room stayed lit and our systems stayed up, but we should have immediately heard the roar of the generator out back as it kicked in to power the office. The generator did not come on and we realized our systems were running on the batteries of the UPS unit (uninterruptible power supply). We had only about 30 minutes of power. If the power grid did not come back on in the next few minutes we would have to start an orderly shut down of the systems while we still had time to do so.

The power did come back on. We looked at each other and thanked our lucky stars. We called a service technician to check out the generator right away. He found that although the generator turned on when we ran our monthly tests, the fail over switch that sensed when the power grid went down was not working. We replaced the switch.

Then we ran another test that weekend. We turned off power to the building to see if the generator came on. The generator came on but within minutes it overheated and shut itself down when subjected to the full load of carrying the office. This started a sequence of tune-ups, repairs, and tinkering to try to get the 18-year-old generator to actually work

under real conditions. After another few days and several more tests my staff and I realized the old generator could not be trusted. I drew up a budget request for a new generator.

The CEO refused to spend any money. He insisted that we find a way to make do with what we had. In a meeting to discuss the situation he told me the generator light in his new Cadillac car had recently come on and the dealer wanted him to spend a lot of money to fix it, but he had ignored the advice and the problem went away.

For the next month and a half we saw more studies, more tests, more generator part replacements, and more meetings. Under the CEO's direction, the CFO got involved and started an inquisition to determine what he called "the true facts of the case". Everyone, including me, retreated to their offices and began writing CYA (cover your a--) memos. It was clear that if anything went wrong everyone would be potential scapegoats in the finger-pointing that would ensue.

The CEO was determined to hold the line on spending and make his profit targets for the quarter. Deferring a new generator purchase was one way to do this. The upside was that he looked good and made his budget numbers. The potential downside of his choice would have been catastrophic. It was bad enough if the power went off during the day, but what if it went off at night or on a weekend? The batteries of the UPS unit would last for half an hour and then our systems would experience a hard crash.

All our service warrantees explicitly excluded coverage for damage from a hard crash, and we would probably have to replace much of our systems hardware infrastructure. Because our off-site disaster recovery project was also not fully funded it would take weeks to restore our systems. In addition, several of our most important customers had begun using certain of our systems to support their own internal operations. And we had promised them they were properly backed up and covered in the event of power or equipment failure.

The CEO did not use participatory decision making nor did he encourage or respect an obligation to dissent in his meetings. Any trust that might have existed among members of the management team quickly disappeared. After two months of high risk and drama a decision was finally made at the beginning of the next quarter to replace the old generator. I left the company soon thereafter.

HOW TO TELL A WINNING PROJECT FROM A LOSER

Enterprises can outsource a lot of functions, but they cannot outsource the activity of looking out for their own best interests. If they do, they wind up in a very weak position where they "depend on the kindness of strangers."[7] The continuous development of new systems to support evolving enterprise strategy requires that CIOs become very good at evaluating project activities and the likelihood of project success as they move through their development life cycle.

Three Main Areas of Concern

Answers to these questions help people connected with a project make accurate assessments and take appropriate corrective actions. Three main areas of concern need to be investigated on any development project:

1. The goodness of the system design.
2. The progress made in building the system.
3. The competence and confidence of the people on the project.

Goodness of the System Design   Notions that good designs must include state-of-the-art technology or complex processing logic are entirely misplaced. The goodness of a particular system design is measured by the combination of two probabilities. The first is the probability that the system will meet the performance criteria that were specified for it to accomplish its business goal or mission. The second probability is the probability that the system can be successfully built.

The best system designs usually do not use state-of-the-art technology or complex processes for the very reason that newness and complexity tend to introduce uncertainty. Uncertainty reduces the probabilities that the system will perform as expected or that it can be built on time and on budget.

The goodness of a system design can be accurately predicted by the extent to which it respects the seven strategic guidelines for designing systems. If a design omits only one of these guidelines—as long as it is not the first guideline—it may still be a good design. When a design disregards two guidelines there had better be *very* clear and convincing reasons. There

must also be well-thought-out preparations to compensate for design omissions. Designs that disregard three or more of the guidelines will fail. The probability of building a successful system that violates this many guidelines is about the same as the probability of winning the lottery.

Progress Made in Building the System   Successful development projects move along at a smart pace. The pace of progress must be aggressive or the project tends to lose its focus and begin to wander aimlessly as the world passes it by. An aggressive pace requires two things: (1) rigorous application of the six tactical principles for running projects; and (2) effective time boxing.

The CIO is responsible for applying the first tactical principle, which is to make sure there is a qualified full-time leader (system builder) for every project. It is then the responsibility of the system builder to effectively apply the other five tactical principles. There is no convincing reason to ignore any of these principles. When the system builder omits one or more of these principles, you need to do everything in your power to reinstate the missing principles. These principles are mutually reinforcing. Omitting even one principle creates a dynamic that undermines the application of all the others.

The second requirement for moving projects along at a smart pace, effective time boxing, means that the activities of each project team are organized to follow a clear "Define-Design-Build" sequence for developing systems. The activities in each of these three phases need to be completed within the time-box constraints and budgets appropriate to each phase. The system builder works with the project team leaders to set the time boxes, and the project teams keep up the pace to meet their self-imposed deadlines. See Chapter 3 for an in-depth discussion of the Define-Design-Build sequence for ways to promote a tactical, agile IT organization.

Competence and Confidence of People on the Project   People charged with developing new systems must be competent and confident in order to succeed. Competent people who lack confidence move slowly. Confident people with no competence have even more trouble. Systems development people must possess both the know-how and leadership skills.

CIOs can measure people's qualifications. The first type of measurement

determines the degree to which people working on the projects can make good tactical use of relevant analysis and design techniques such as process mapping, data modeling, and system prototyping. Good use of technique is everything for people working on or leading project teams.

The system builder and the team leaders need to understand and know when to employ each relevant technique. They must be competent in all relevant techniques and masters of a few of them. Individuals on the project teams must be competent in or masters of the specific techniques they will need to fulfill their roles on the team. The efficient use of relevant techniques allows project teams to complete their work within the aggressive time-box constraints that successful projects demand.

The second type of measurement determines the degree to which the system builder and the team leaders are capable of demonstrating the requisite leadership skills. After a period of watching someone in action, most experienced CIOs can make a fairly accurate assessment of that person's design and leadership skills. When project leaders and team leaders have these skills, good system designs emerge, effective leadership happens without rancor, and a visible air of confidence becomes evident on the faces of the entire project team.

Project Evaluation Checklist

Goodness of System Design   Ask yourself and the system builder in charge these questions for each project. Whenever possible, ask these questions in the first 2–6 weeks (the Define phase) of the project:

1. **What is the business goal or mission of the project?** In two sentences or less state the action the company is going to take and state the desired result of that action. This goal is the target, the destination the project is supposed to reach. If you do not know where you are going, then you will only get there by random chance. If you cannot clearly and simply state the goal that the system is supposed to accomplish, then neither you nor anyone else really knows what the system is supposed to do. Figure this out or stop the project.

2. **What are the performance criteria that the system is supposed to meet?** State what requirements the system will meet in four areas:

Business Operations
Customer Expectations
Financial Performance
Enterprise Learning and Improvement

These performance measures are the specific measures that determine whether the system is successful. Make sure that you know what they are and that the people designing and building the system know what they are as well. Otherwise, you will get a system that does not do what you want.

3. **As an experienced businessperson, do you believe that a system that meets the preceding performance requirements will in fact accomplish the business goal that you are striving to achieve?**

   If you have a feeling that some important performance requirements have been left out, then add them before the project gets any farther along—but make sure you do not add requirements that are not strictly necessary to accomplish the business goal. When the performance requirements become too broad, this will result in increased system complexity and lower the chances that the system can be successfully built.

4. **What existing computer systems in your enterprise (that work well enough) are being leveraged in the design for the new computer system?**

   The new system should leverage the strengths of systems and procedures that already exist in your enterprise. Focus the system on delivering new capabilities instead of just replacing existing resources that already work well enough. If you decide to replace everything and build from a clean slate you had better be prepared for the considerable extra time and expense involved, and be sure that it is worth it.

5. **How does the overall design for the new system break down into a set of self-contained subsystems that can each operate on their own and provide value?**

   Large computer systems that cost a lot of money are really made up of many smaller subsystems. Your enterprise should be able to build each subsystem independently of the others so that if one

subsystem runs into problems, work on the others can still proceed. Subsystems need to be put into production as soon as they are completed to begin paying back the company for the expense of building them. If all subsystems must be complete before any individual subsystem can be used, you've chosen a very risky all-or-nothing system design. Change that.

6. **How accurate is the cost/benefit analysis for the new system? Have the business benefits been overstated? Would the project still be worth doing if the business benefits were only half of those predicted?**

    Cost/benefit calculations usually understate costs and overstate benefits. You are the one best able to judge the validity of the benefits—do you believe they are accurate? The bigger and riskier the system development project, the larger the benefits must be to justify the risk and expense. Do not spend more on a system than it is worth.

7. **Who is the senior technical person in charge of the project—the system builder? How has this person demonstrated that their system design and project leadership skills are appropriate to the demands of the project?**

    If you do not have a qualified system builder in charge of the project, it will fail from lack of direction—management by committee will not work. People without the necessary design and leadership skills are not qualified and must be replaced no matter what other skills they may possess.

    Ask the system builder to explain to you which of the strategic guidelines for designing systems have been followed and which have not. For those that have not been followed, why not?

    If all the seven strategic guidelines are followed, your system design is very good. It is acceptable if one of the guidelines is not followed—any one as long as it is not the first one. If two of the guidelines are not followed there had better be *very* good reasons, and extra precautions need to be taken to compensate for the increased risk. What are these precautions? If more than two of the guidelines are not followed, then the design is fatally flawed—the system cannot be built on time or on budget if it can even be built at all.

Progress Made Developing the System   Ask these questions once the conceptual system design and initial budget have been agreed upon—the end of the Define phase. Ask these questions of yourself, the system builder, and the people on the project team as the project moves through the Design and Build phases.

1. **Is there a project plan and budget in place? Do people pay attention to the project plan? Is there a project office group that provides people with regular and accurate updates to the plan and the budget?**

   Multimillion-dollar system development projects involve a lot of people and stretch across some period of time. The project plan is the central coordinating instrument that tells every person at any given time exactly what each are supposed to be doing. If the plan is not kept current, the people on the project have no way to effectively coordinate their work with each other. The system builder will lose track of the details. Delays, cost overruns, and confusion will result. People will lose control of the project budget—they will not know how much has been spent to date or how much more is required to finish. When this happens, the project goes into a death spiral.

2. **Are the teams working on each subsystem organizing their work into a clearly defined Design phase and a Build phase? Are these phases getting done within the appropriate time boxes and budgets? Or do time-box constraints keep expanding and budgets keep growing?**

   The project team working on each subsystem should spend one to three months (and no more) to create a detailed design and system prototype (Design phase). The detailed design should then be turned into a working system within two to six months (Build phase). If this work takes any longer, the project is moving too slowly. It will lose momentum and start to drift. It is the system builder's responsibility to keep things organized and moving—make sure this person is in place and is qualified.

3. **Ask the system builder to explain to you how the six tactical principles for running projects are being applied to the running of this project.**

Do you believe the answers you hear? Can the system builder explain the situation clearly without "tech talk" and jargon? A qualified person can give you straight answers. The system builder is in effect your general contractor who is running the job. This person can make or break the project—get a new one if you need to.

Spot-check the project plan and budget from time to time. Have the system builder review the current, updated project plan with you and explain the situation on the project as of that week. Review the project budget—have the system builder show you the money spent to date on each subsystem and the estimate for remaining time and budget to complete each subsystem. How does the most recent estimate of time and budget compare to the original estimate for time and budget? Is it still worth the cost to complete the project?

Competence and Confidence of People on the Project   Ask these questions of yourself, the system builder, and the people on the project teams:

1. **Ask each of the project teams to make a presentation to you at the end of their Design phase where they show you the design specifications they have created. Ask them to walk you through the process flow diagrams and the logical data model for the subsystem for which they are responsible. Ask them to show you the user interface, the technical architecture diagrams, and the system prototype.**

   Can they tell you how this system will deliver the business benefits that are listed in the cost/benefit analysis? Do the design specifications make any sense? Do the people on the team know what they are talking about?

2. **Are the project team members as confident in the success of the project as the project team leaders? Are the team leaders as confident as the system builder?**

   If people feel they have the right skills and believe they have a good system design to work from, they will be confident in their ability to build the system. There is a problem somewhere if people

at every level of the project do not share and reflect this confidence. If people are trying to transfer onto the project, that indicates people have confidence it will succeed. If people are transferring off the project or leaving the company, that indicates people have no confidence and expect it to fail.

■   **NOTES**

1. Robert S. Kaplan, David P. Norton, Strategy *Maps: Converting Intangible Assets into Tangible Outcomes,* (Boston: Harvard Business School Publishing, 2004).

2. Sir Basil Henry Liddell Hart (1895-1970), *Strategy,* (New York: Penguin Books, 1967). I came across Liddell Hart's book years ago and found Chapter 20, "The Concentrated Essence of Strategy" to be one of the most lucid and succinct discussions of strategy I have ever read. My seven strategic guidelines for designing systems are much influenced by his book.

3. Kevin Kelly, *Out of Control: The New Biology of Machines, Social Systems and the Economic World,* (New York: Perseus Books Group Company, 1995). This book has many useful insights for the design and building of systems and many of these insights are summarized in Chapter 24, "The Nine Laws of God."

4. This section first appeared in an article I wrote for Computerworld magazine titled, "The Rhythm of the Quarters" published 17 October 2005.

5. Jason Santamaria, Vincent Martino, Eric Clemons, *The Marine Corps Way: Using Maneuver Warfare to Lead a Winning Organization,* (New York: McGraw-Hill, 2004).

6. William Lind, *Maneuver Warfare Handbook,* (Boulder, CO: Westview Press, 1985).

7. These are the famous words spoken by the vulnerable character Blanche DuBois in the play by Tennessee Williams, *A Streetcar Named Desire,* (New York: Viking Penguin, 1947).