CHAPTER 19

Strategy

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The Popular Conception of Strategy

Everybody talks about strategy…

- "What's your strategy for finding a job?"
- "What's our strategy for getting this project done on time?"
- "What strategy can I use to get out of debt?"
- "What's our strategy for winning the next election?"
- "What's your strategy for getting your spouse to agree to our golf trip to Las Vegas?"
- "What's the strategy for turning around the slumping economy?"
- "What's our strategy for winning the game next Sunday?"
- "What strategy should we use to introduce this new product to the market?"
- "What strategy can bring peace to the region?"
- "What's your strategy for getting Nadine to go out on a date with you?"

From this list, it should be obvious that the word *strategy* is used in many different ways to connote a wide variety of meanings.

Strategy's origin is military, dating back as far as the Chinese general, Sun Tzu in the fifth century BC (Cleary, 1991). In modern times, its military aspect is most often associated with Clausewitz, Moltke, Liddell Hart, and, more recently, Boyd. Nearly all military definitions of strategy involve objectives, winning, application of resources, and execution of policy.

The commercial business community tends to see strategy almost exclusively in terms of Marketing or Finance. Michael Porter's (1985) famous "low-cost leader versus differentiation" concept was the basis of his landmark book, *Competitive Advantage*, the virtual bible of business schools for many years. However, such a narrow characterization ignores the applicability of strategy to other kinds of activities and organizations, such as government agencies and not-for-profit groups—systems that do little or no Marketing and Sales, or are not in business to generate a profit. Moreover, it fails to consider some of the personal, but no less valid, applications of the concept.

The underlying relationship is *not* between strategy and a particular type of organization; it's between strategy and *systems*. Understanding the distinction frees the imagination from artificially imposed constraints on how, and for whom, strategy might be constructively employed.

The System Concept

It is difficult for many people to think conceptually in terms of systems. It's easier for them to pigeonhole systems as "organizations," either formal or informal. Yet, as Table 19-1 shows, the system concept goes well beyond organizations.

In its simplest incarnation, a system is made up of inputs, a process of some kind, outputs, and the environment in which these components exist (see Fig. 19-1).

Any system interacts with other similar (or dissimilar) systems that co-exist in the same environment, and with elements of the external environment itself. Some of these other systems might include suppliers, customers, regulatory bodies, special interest groups, competitors, societal groups, educational institutions, etc. The interactions among systems—or lack thereof—are related to the nature of the system's chosen functions and activities.

In view of the far-reaching nature of systems and their interactions with other systems and the environment, it would be myopic to consider the concept of strategy exclusively in terms of narrowly defined organizations or departments such as Marketing/Sales or military operations. Moreover, while strategy can certainly be developed and deployed without any prior knowledge of the *Theory of Constraints* (TOC), a thorough familiarity with TOC concepts and principles, in addition to systems thinking, enhances the quality of any strategy subsequently developed. More needs and opportunities are likely to become visible.

A Vertical Hierarchy

Besides the "horizontal" conception of strategy across different types of organizations—commercial, not-for-profit, government agency—there's a vertical perspective as well. This vertical aspect is related to system *levels*.

Human	Economic	Political
Personal	Commercial	Governments
Family	Economies	Administrative
Society	Local	Political parties
Cultural	State	Revolutionary movements
Educational	National	Information
Charitable	Transnational	Security (law enforcement, military)
Social	Information	
Knowledge	Technical	

Note: Biological and other "non-thinking" systems are excluded from consideration here. Our attention is confined to systems involving human cognition and decision-making capability.

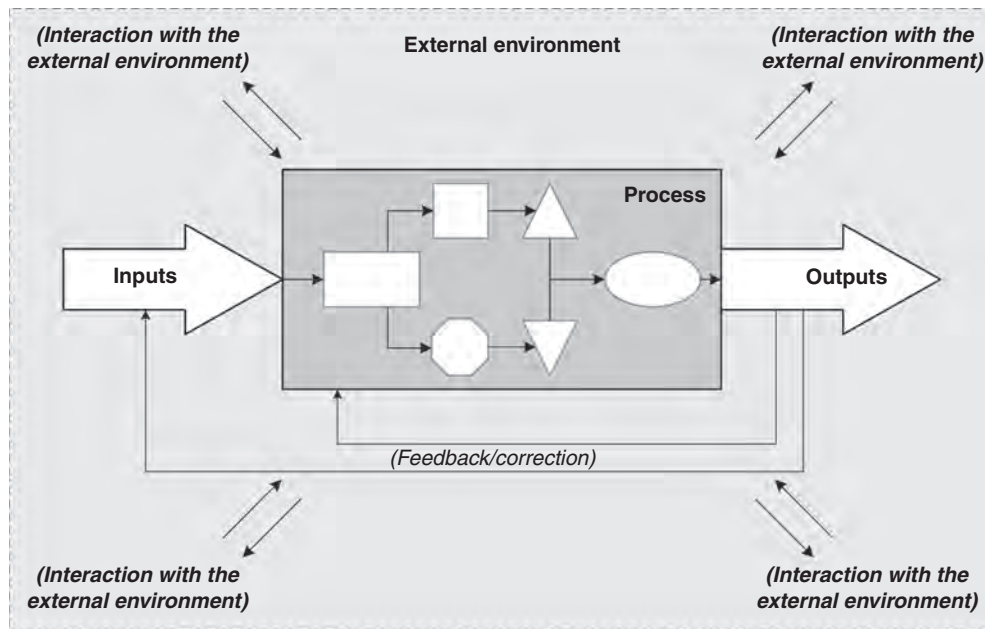**TABLE 19-1**   Types of Self-Aware Systems

FIGURE 19-1   Basic system.

Systems are hierarchical. What usually occupies our attention is no more than one level of a larger system composed of multiple levels. An old rhyme characterizes the vertical relationship:

> Big fleas have little fleas
> Upon their backs to bite 'em.
> Little fleas have lesser fleas,
> And so on, ad infinitum. (Ramel)

Military organizations differentiate among vertical system levels by using different terms, depending on the level under scrutiny. From highest to lowest to highest, this taxonomy is as shown in Table 19-2.

The content of each of these terms decreases in "granularity" as one moves upward in the hierarchy. In other words, tactics are much more detailed, discrete, and narrowly focused than operations. Strategies are much more general and broad than operations, which themselves are more general than tactics.[1]

Term	System Level
Grand strategies	Nations
Strategies	Unified commands (multi-service)
Operations	Larger units
Tactics	Small units

TABLE 19-2   System Levels

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[1]The military context is the basis for this taxonomy, as reflected in Table 19-2. In military applications, operations are large-scale coordinated events (often multi-service). Tactics are normally employed by smaller, discrete units.

Non-military organizations don't normally make these distinctions, although they could—and perhaps should. Complex systems or organizations experience significant interdependencies among their internal components, the external environment, and other systems.

A Common Denominator

If one accepts that the concept of *strategy* embodies both vertical and horizontal dimensions, a real need for a common definition of the term emerges. Whether one calls it strategy, operations, or tactics, it answers the same underlying question: *how do we get from where we are to where we want to be?* Or, expressed another way, how do we achieve what we've set out to do?

Turning this question into a useful definition that suits both the variety of organizational types and the multiplicity of system levels, a "common denominator" definition of *strategy* might be:

> How systems or individuals go about closing the gap between a current condition or position and a desired future state.

This definition is sufficiently inclusive to account for systems with multiple layers as well as different kinds of systems. It's not confined to military systems alone, nor is it exclusively centered on Marketing or Finance. Rather, it addresses both *means* (how) and *ends* (future state), regardless of the type or complexity of the system.

A Whole-System View

Means and ends don't exist in isolation. Every system having means and ends operates in some kind of environment. The nature of the environment—its economic, social, political, and technical characteristics—defines and delimits the resources and range of options a system can exercise in executing its strategy.

The relationship between a system and its environment naturally implies *decisions* about how to employ available resources in pursuit of the system's ends—in other words, in executing strategy. In the modern world, neither the environment nor resource availability remains stable for long. The external environment is subject to a wide variety of variables, too. Consider, for example, the extreme fluctuations in international oil prices, the collapse of the U.S. sub-prime mortgage sector, and the failure of huge commercial banks. For most systems—commercial, government agency, or not-for-profit—such external factors, predictable and unpredictable alike, change their respective playing field in dramatic and uncontrollable ways. Such turbulence continually generates situations requiring choices (decisions), any of which can affect outcomes or ends.

It's almost impossible—certainly impractical—to predict changes in the external environment with any confidence. The same might be true for the availability of resources. It is likewise impractical to preplan for an indeterminate number of contingencies that might happen. Such unpredictability drives a need for rapid, effective decisions, or reactions, during the execution of strategy—perhaps even the revision or replacement of the entire strategy. The point is that in the modern world, *strategy can never be static. It's inextricably linked to execution, and it must be continually reevaluated against the evolving conditions of an ever-changing environment.*

The OODA Loop

Perhaps the most influential development in the art of decision making in the past 30 years is the OODA loop (see Fig. 19-2). The name is an acronym for *observe, orient, decide,* and *act*. However, the OODA loop is considerably more robust than the mere sequential execution of the four steps the name implies.
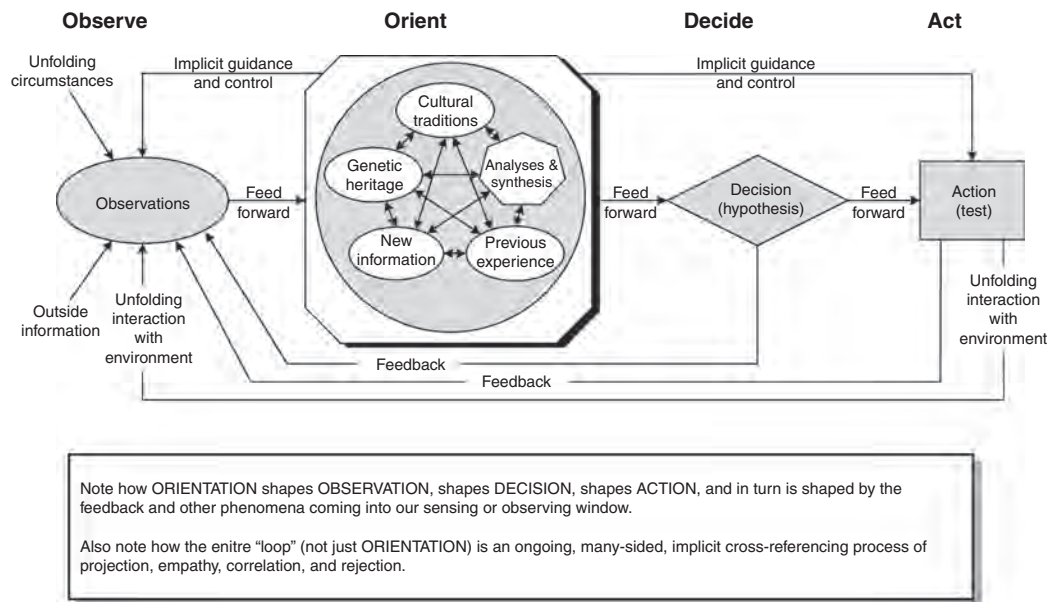
FIGURE 19-2 The OODA loop. (*From Boyd, J. R. The Essence of Winning and Losing. 1996.*)

In much the same way that the Five Focusing Steps (5FS) guide the management of system constraints in constraint theory (Goldratt, 1990), the OODA *loop* is a routine that facilitates rapid, effective decisions at all levels—tactical, operational, or strategic—of any kind of system, whether commercial, government agency, or not-for-profit.

The OODA loop is the conceptual brainchild of John R. Boyd, a U.S. Air Force colonel (1927–1997) who synthesized it from his personal experiences in air-to-air combat, energy-maneuverability theory, policy "battles" in the Pentagon, and extensive research into military history, strategy, and science. However, Boyd's synthesis resulted in far more than the OODA loop alone, which is merely the most visible part of a larger system-level perspective on adjusting and evolving in an ever-changing world. (Coram, 2002; Hammond, 2001; Richards, 2004; Osinga, 2007; Safranski, 2008)

How does the OODA loop facilitate the development and deployment of strategy?

Strategy as a Journey

If one accepts the concept of strategy as summarized in Fig. 19-3, a robust approach to decision making can mean the difference between success and failure in a rapidly changing environment. The first three stages of the *OODA loop—observe, orient,* and *decide*—are essential to the creation of strategy in the first place. The last stage—*act*—clearly applies to deployment of strategy. Nevertheless, it's called a "loop" for a reason—the first three stages also provide the means to detect and respond to the environmental changes that could rapidly render a strategy invalid.

Many companies use an annual strategic planning cycle, meaning that they have a predetermined yearly schedule for reviewing and updating their strategic plans. In other words, they set their strategy for at least a year then don't formally revisit it until the same time next year. But how responsive is that practice to surprise, catastrophic events? How well would such a practice have served the commercial airlines after September 11, 2001, or commercial industries that depend on bank financing after September 2008? If strategy directs a journey

- Strategy prescribes how to move from an existing
  condition to a desired future state
- Strategy applies (horizontally) to systems of all kinds:
  - Commercial
  - Government agency
  - Not-for-profit
- Strategy has whole-system implications (i.e., not
  confined to just a few functions)
  - Marketing
  - Finance
- Strategy has a vertical dimension as well as horizontal
- Strategy is the application of means (resources) to
  achieve ends (objectives)
- Strategies must consider the ever-changing nature of
  the environment in which systems function
- A constantly changing environment requires continual
  decisions to adjust or change strategy

Figure 19-3   Strategy as a journey.

from the current state to some desired future state, it's critical for it to be flexible enough to react immediately to such unexpected surprises. If you were navigating a ship across the ocean and discovered that you had been blown seriously off course, would you wait until the next strategic planning cycle to take corrective action? What if, for some reason, the destination had changed, even without a storm to blow you off course? Would you in any way delay resetting your direction? If not, why would anyone with responsibility for guiding organizations behave any differently?

Orientation and Observation

According to Boyd, the *orient* step is the most critical of all, despite the fact that it appears second in the sequence (Safranski, 2008) That's one reason why he made it more prominent (see Fig. 19-2) than any of the other steps. The orient step is the amalgamation or synthesis of the sum of our knowledge about ourselves, our system, values, customs, culture, experiences (heritage), and the environment (Osinga, 2007). One might oversimplify by saying that our orientation represents our worldview, hard won and tightly held. It's the lens through which we filter sensory inputs of things happening around us or, in other words, the *observations* we make in real time.[2]

The *orientation* step is the one in which a divergence from our expectations is detected. Part of our orientation is the paradigm (Kuhn, 1962) in which we live, the view of the world we create for ourselves based on the factors previously mentioned. These factors all conspire to form our assumptions about the way we think things happen (or should happen). When we observe phenomena or events that don't fit into our orientation, we have what Boyd referred to as a *mismatch*. The existence of this mismatch is determined when we analyze and synthesize our observations with the basis of our orientation or paradigm. In other words, we examine what *is* happening in light of what we expect *should* be happening. This continual analysis-synthesis process is an integral part of maintaining a robust current orientation.

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[2]Many people and organizations make no concerted effort whatsoever to observe what's going on around them and put such observations into any kind of context relevant to themselves. As Winston Churchill once observed, "Man will occasionally stumble over the truth, but most of the time he will pick himself up and continue on" (Winston Churchill, http://quotationsbook.com/quote/19633/).

How does *observation* happen? Sometimes, as in the case of 9/11 or the sub-prime mortgage meltdown, events are thrust upon us in ways that we can't ignore. However, sharp system leaders actively look for changes in the environment and evaluate what effect their observations might have on their orientation—in other words, what mismatches might be emerging. The more this active observation is practiced—and the observations synthesized—the more sensitive one eventually becomes to small changes, which may be indicators of more dramatic changes yet to come. This has relevance to competitive advantage, which will be discussed in more detail shortly.

As Fig. 19-2 indicates, observations include new outside information, such as research or technology breakthroughs. Unfolding circumstances include the entry of new competitors into the market, new laws or regulations, or world events such as skyrocketing crude oil prices, increased activity of Somali pirates in the Indian Ocean, financial chaos in one sector of the economy, or other international geopolitical developments. Unfolding action with the environment specifically refers to the environmental effects of actions the system might take—the other side of the equation from the impact of environmental changes on the system. Implicit guidance and control (at the top-left in Fig. 19-2) represents the changes in a system leader's observations based on the synthesis of new information, even before decisions or actions are contemplated.

Decision and Action

Completion of the orientation step implies that a mismatch or gap between reality and expectations has been identified. The next step would seem to be to *decide* what to do about it. The decision step in the OODA loop may be deliberate or intuitive. In complex situations, when the decision maker isn't intimately familiar with the environment or the possible options, this step is likely to require deliberation: "We know that things are not the way they should be—now what should we *do* about it?" A more formal or structured decision process might ensue.

However, if one's knowledge of the system and its environment is comprehensive (usually born of deep experience), it may be intuitively obvious what needs to be done. In this case, decision makers often proceed directly to action. This is reflected in the upper-right part of Fig. 19-2 (implicit guidance and control).

Even if decision making is more deliberate, available options are often logically tested—that is, compared to reality and their potential outcomes assessed—before proceeding to the action stage. This "hypothesis testing" is reflected in Fig. 19-2 in the feedback loop between "Decisions" and "Observations." The purpose of this testing is to help reduce the impact of uncertainty on a decision among several options.

Inevitably, however, even with the hypothesis-testing feedback loop, the ultimate end of the OODA process is an action of some kind. And because action inevitably influences the environment in some way—after all, that was its purpose in the first place—the process begins all over again with observing to assess the action's impact. This in turn begets a second iteration of the orientation step to determine how much impact the action had, whether it changed reality in the desired direction, and by how much. The size of the mismatch that results from this second orientation leads to another decision and subsequent action. And the process continues until the ultimate goal of the system is attained.

"Pro-Acting" Rather than Reacting

Superficially, it might seem that the OODA loop is reactive. However, Boyd's contention was that controlling an emerging situation was far preferable than reacting. Consequently, his prescription for using the OODA loop was anything but passive. He was highly motivated

to "stir the pot"—to use the OODA process to *create* mismatches, especially in the perception of adversaries. In this respect, he recommended being pro-active, rather than reactive.

However, rational decision making and action depends on a conscious awareness of these four steps: *observe, orient, decide,* and *act*. In reality, most people actually do something like this, but they do it unconsciously or intuitively. They're usually unaware that they're doing it, which means that they are less likely to "keep the pressure on." Without consciousness about the OODA process, like the fabled hare they're likely to take a nap alongside the road while the tortoise passes them by.

Fast OODA Loop Cycles

Boyd went even further with the pro-active OODA concept. He contended that if one could cycle through these four steps faster than one's adversary could, a competitive advantage would begin to open up. The non-OODA practitioner would always be at least one cycle behind the OODA user. Moreover, if the OODA user could somehow complete two or more cycles in the time the adversary took to finish one, it would sow confusion in the opponent's camp. In battle (the context for which Boyd created the OODA loop), this ultimately results in panic, knee-jerk (wrong) reactions, and eventual collapse of the opponent.

The effect is not materially different in business settings. Witness, for example, the introduction of high-technology innovations by the Japanese for nearly two decades. It was commonly recognized that while the world's markets were enamored of their latest, greatest product introduction (first the Walkman, then CDs, then digital cameras, then compact video devices, then DVDs and MP3 players, etc.), the Japanese were hard at work on the "next big thing." The rest of the world was always at least one step behind.

Boyd himself provided the original, quintessential example of the fast-cycle OODA loop. As a U.S. Air Force fighter weapons instructor in the 1950s, he made a standing offer to all pilots: He would beat his opponent in 40 seconds or pay them $40. In eight years, no one was ever able to collect the $40 (Coram, 2002). The reason was that he was always able to execute what amounted to a near-instantaneous OODA cycle faster than any of his opponents could.[3]

Summarizing Boyd

Let's quickly review what we've just covered.

- The OODA loop describes a process of observing, synthesizing those observations (orientation), deciding what to do because of the synthesis, and acting on that decision.

- Although all systems go through this OODA process, most are completely oblivious to the fact that they're doing it.

- The OODA loop was originally conceived as a way of mentally managing combat engagements to achieve victory, but its applicability in the development and deployment of strategy has yet to be fully realized.

- The OODA loop appears, on the surface, to be reactive to changes in the environment; however, a deft practitioner can use it proactively to shape the environment or competitive arena to his or her own advantage.

- The ability to cycle through the OODA loop multiple times while others do so only once can provide an insurmountable competitive advantage.

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[3]It was nearly two decades before Boyd himself actually identified, analyzed, and articulated the OODA process he was unquestionably practicing it in the 1950s. But he was doing it all the same.

Armed with this knowledge of systems and the OODA loop, leaders can enjoy a substantive potential advantage over others (and the environment) in achieving their systems' goals. However, this advantage remains exclusively potential without discrete tools with which to execute the OODA loop.

The Logical Thinking Process

Concepts such as the OODA loop are eminently useful but sometimes difficult to translate to practical application without some kind of tool to bridge the gap between the conceptual and the practical. Fortunately, the appropriate tool for applying the OODA loop strategically is readily available: The *Logical Thinking Process* (LTP).[4]

The LTP is an outgrowth of the evolution of TOC. Originally conceived as a production scheduling and management methodology called "Drum-Buffer-Rope" (Goldratt, 1990), in the late 1980s and early 1990s TOC outgrew its former production-oriented boundaries and spread into the broader category of systems. One of the first such forays was the thinking process. When it became obvious that resolving production bottlenecks alone didn't always produce more a more successful company, Goldratt needed another solution. He conceived the thinking process to address the application of his 5FS (Goldratt, 1990) when system-level constraints were not production bottlenecks—when the factor limiting overall system success lay in non-production areas.
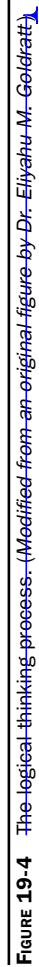
This was a critical breakthrough because it raised the whole idea of constraint theory to a system concept, rather than just being a production methodology alone. The thinking process afforded a means to examine systems of any kind, not just production companies, and identify the one factor limiting the system the most in its mission to achieve its goal.

Originally composed of five logic trees or tools,[5] the thinking process represented a simple application of the scientific method to the challenge of complex system problem solving: what's the problem (what to change), what do we do about it (what to change to), and how do we do it (make the change happen)? For the first time, the thinking process offered a concise, direct way to logically analyze whole systems composed of myriad complex interactions and do so rapidly. Moreover, it also allowed for "hypothesis testing" without extensive real-world experimentation to verify the validity of proposed changes. In addition, what it also did that no other problem-solving methodology did was to include a solution implementation "module"—the prerequisite and transition trees. In other words, a complete package. Figure 19-4 illustrates the conceptual flow of the thinking process as originally conceived by Goldratt.

Over the intervening years since Goldratt introduced the thinking process, the trees and their application have evolved and been refined. Although the process was originally intended to solve complex problems by identifying system constraints and facilitating ways to break them, it was inevitable that other applications would emerge. One of these was the use of the thinking process for strategy development and deployment (Dettmer, 2003). However, applying the thinking process for strategy development purposes requires some modification of both the trees and their sequence. To distinguish these evolutions from the original thinking process, the term "logical thinking process" is used hereafter.

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[4]Different people variously refer to the methodology created by Goldratt as *thinking process* or *thinking processes*. For the past eight years, I have inserted the word "logical" when I refer to it and used the singular form in order to more simply convey what the method involves to audiences having little or no prior exposure to TOC. The simplified, more streamlined version of the thinking process that I teach now—what amounts to a third generation—differs enough from Goldratt's initial conception that I believe it warrants a modified name. The essential concept of logic trees, though, is still the brainchild of Goldratt.

[5]Current reality tree, evaporating cloud, future reality tree, prerequisite tree, and transition tree.

Current Reality Tree
(problem identification)

UDE

UDE

CP

Evaporating Cloud
(conflict resolution)

(Conflict)

CP

INJ

UDE = Undesirable Effect
CP = Core Problem
INJ = Injection
DE = Desired Effect
OBS = Obstacle
IO = Intermediate Objective

Future Reality Tree
(proof of solution concept)

DE

DE

INJ

INJ

INJ

Prerequisite Tree
(resolving implementation obstacles)

OBS

OBS

IO

IO

OBS

IO

OBS

IO

The logical thinking process

• Current Reality Tree identifies the
  underlying problem

• Evaporating Cloud resolves conflict
  associated with change

• Future Reality Tree tests proposed
  solution

• Prerequisite Tree overcomes
  implementation obstacles

• Transition Tree prescribes step-by-step
  implementation

Transition Tree
(step-by-step implementation)

INJ

Action

Action

Action

Figure 19-4 The logical thinking process. (*Modified from an original figure by Dr. Eliyahu M. Goldratt*.)

The Intermediate Objectives Map

The most significant modification to the LTP for strategy development is the insertion of a new type of tree—the *Intermediate Objectives* (IO) Map—at the beginning of the process (Dettmer, 2007). The IO Map is critical to the strategic application. In fact, without it, the remainder of the LTP is nearly useless for strategy development.[6]

The IO Map is a relatively simple structure, but actually putting one together requires some dedicated thinking. Figure 19-5 shows a conceptual version of the IO Map. An actual IO Map may be found in Fig. 19-11 at the end of this chapter.

The goal indicated at the top of the IO Map is the ultimate outcome for which the system strives. In a for-profit commercial company, this is usually maximum profit. In not-for-profit organizations, such as charities or hospitals, the goal is usually some favorable contribution to society. Goals of government agencies are likewise not profit-oriented, but rather seek the successful provision of some beneficial service to the general population.
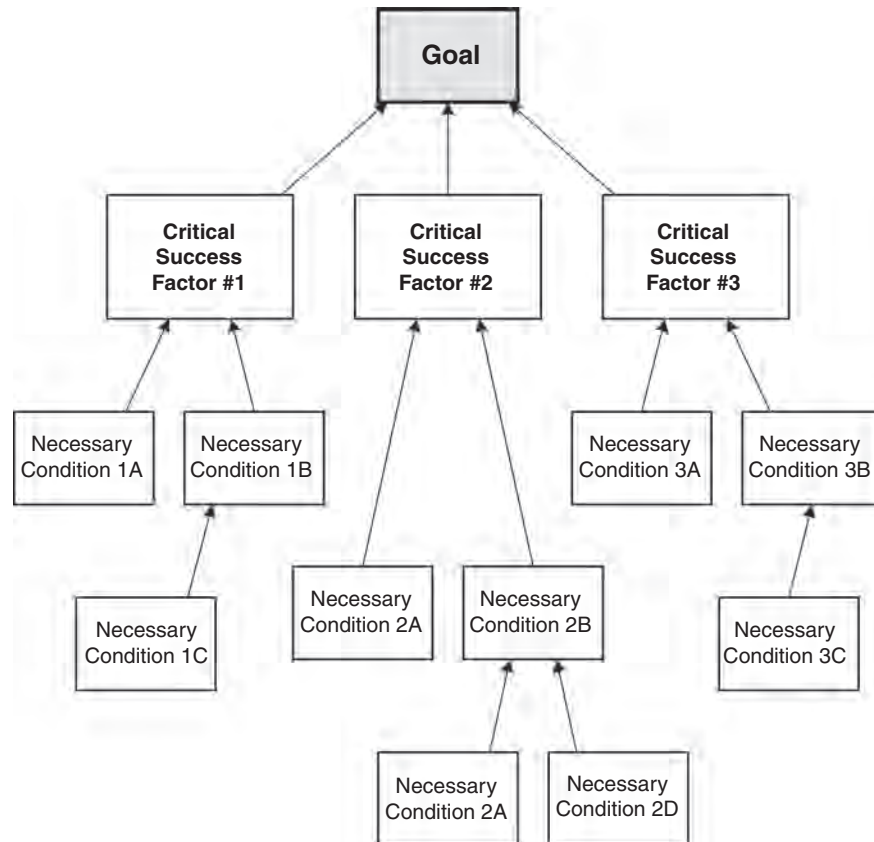

FIGURE 19-5   Intermediate objectives map.

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[6]The use of the IO Map is not limited to strategy development alone. As it happens, its use as the first step in the LTP for *any* purpose is highly recommended. See Dettmer (2007) for a more detailed explanation.

Every goal is typically achieved by realizing a set of *critical success factors* (CSFs). These CSFs are terminal outcomes, or results. They're considered critical because they're indispensable to attainment of the goal. In any system, and for any goal, very few CSF are normally required to declare goal attainment. For most systems, they would number no more than three to five. CSFs represent very high-level outcomes. They are usually somewhat generic to the category of the system under discussion. For example, the CSF for any profit-oriented company would be quite similar, differing primarily only in degree of emphasis. If the goal of a commercial company is to maximize profits, there are really only three CSFs: increased Throughput, minimized Inventory, and controlled Operating Expenses (see Fig. 19-6).

Notice that none of these differs, whether the company is an automobile manufacturer or an insurance company. If these CSFs are realized, then the inevitable outcome is a company that has maximized profitability.[7] Where do the specific details of company activities (processes, products, competitive factors, etc.) fall? They lie beneath the level of the CSFs themselves, in what Fig. 19-5 depicts as *necessary conditions*. It is at the necessary condition level that the unique picture of a particular organization emerges. Figure 19-7 shows how this might look for a typical manufacturing company.

The CSFs of a not-for-profit organization or government agency would be somewhat different from those of a commercial company. For one thing, neither usually measures its Throughput financially, but rather in terms of whatever non-pecuniary benefit the organization is in business to provide for society. Minimum Inventory and controlled Operating Expense might certainly be relevant, however.

The question of where to put such non-negotiable requirements such as adherence to the law, compliance with regulations, or environmental responsibility inevitably comes up. None of these factors, and others comparable to them, directly affect profitability, so they clearly don't fit as critical success factors. However, they usually do serve to define the behaviors associated with fulfilling them. In other words, their proper place is as necessary conditions for the generation of Throughput, the reduction of Inventory, or the control of Operating Expense. This positions them at least three layers down in any IO Map, and probably even lower.

How far down should the IO Map be "drilled?" For constructing a subsequent *Current Reality Tree* (CRT), it's not necessary to go much below the CSF and perhaps one or two layers of necessary conditions. However, for resolution of conflicts that might develop in using the
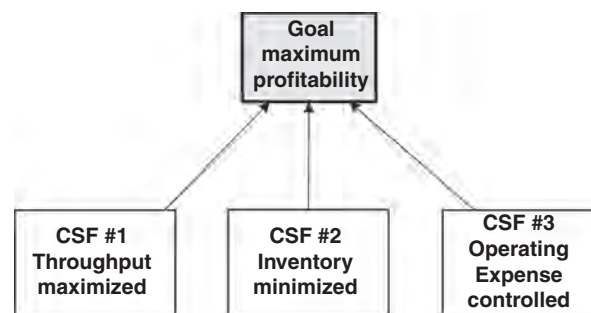

FIGURE 19-6   Goal and critical success factors (commercial company).

[7]Note that depending on environmental conditions, "maximum profitability" might actually be numerically negative. Nevertheless, it would be the smallest negative number possible to achieve.
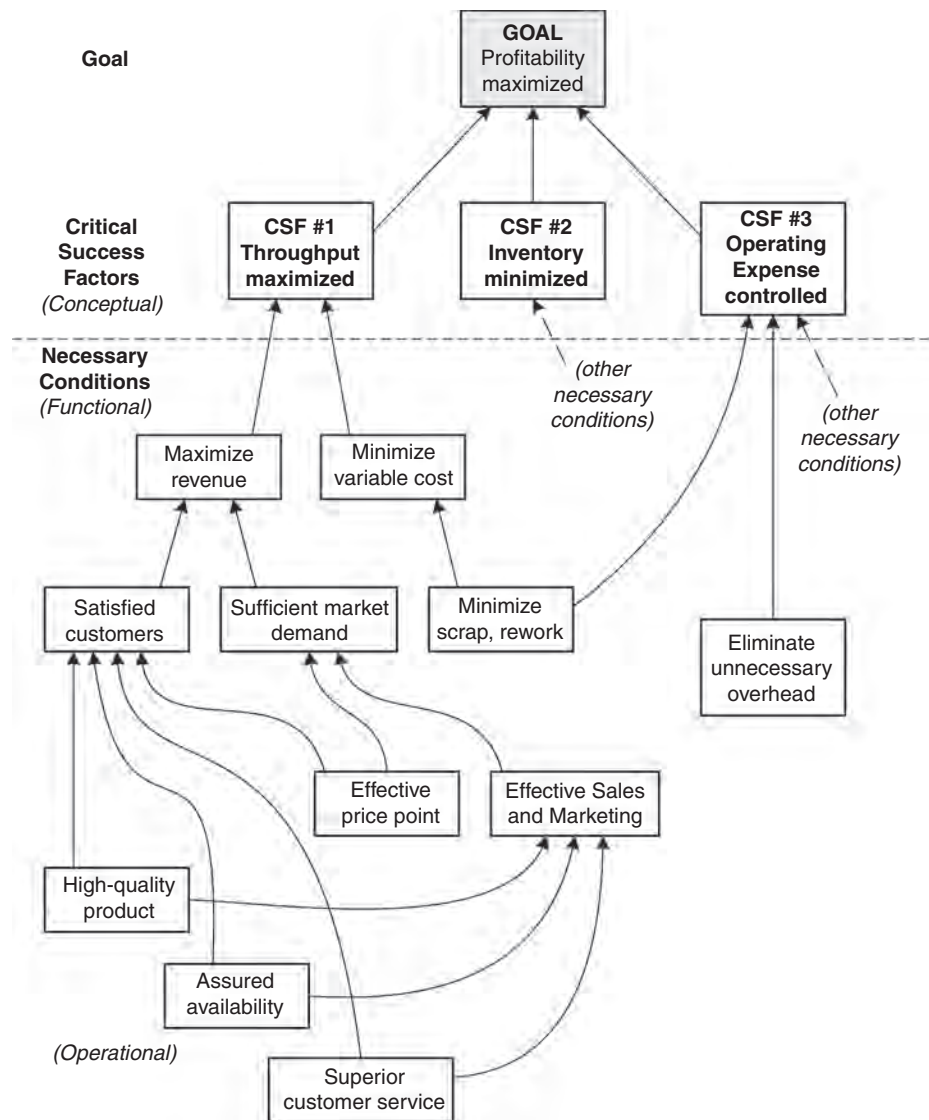
Figure 19-7   IO Map (partial)—commercial company.

LTP for either strategy development or for complex problem solving, it might be advisable to penetrate down five or six layers.

When the IO Map is completed, it provides two crucial ingredients for the successful application of the rest of the LTP. First, it clearly delineates the discrete activities and outcomes required to ensure achievement of the system goal (without regard to what is actually happening at the moment). Second, it provides the basis for consensus among everyone within the system—executives, managers, and specialized employees alike—on what they should be doing to support one another in a coordinated way. This might be called a "unified vision" of where the company is going and what's required to get there.

Constraint Management Model: A Synthesis of TOC and the OODA Loop

The 5FS, the heart and soul of constraint theory, constitute the guiding framework for real system improvement. The OODA loop represents an articulated model for a true cybernetic system—one that is not only capable of self-improvement, but self-determination of direction as well.[8] There is an implicit relationship between the two (see Fig. 19-8).

The 5FS are inherently a subset of the OODA loop. Identification of system constraints requires observation and orientation (the first two steps in the OODA loop). Exploitation, subordination, and elevation are all elements of the decision step in the OODA loop. The actions to follow the prescriptions of the 5FS are the same as the final step of the OODA loop. Both employ a feedback process to begin the cycle again. What makes the OODA loop more generic than the 5FS is its applicability to situations in system operations that don't involve identifying and breaking constraints or dedicated system improvement effort.

Boyd originally conceived the OODA loop to help manage tactical operations. The O-O-D-A (and repeat) cycle is inherent in activities as narrowly focused as driving a car safely on a winding road, or as broad as steering the progress of a corporation into its future. However, it's this last, broader perspective with which we're concerned when we talk about strategy.

If we accept the idea that developing and deploying strategy is an expression of the OODA loop, the question that naturally follows is, "How do we go about doing this?" This is where the LTP offers an ideal solution. The combination of the OODA loop and the LTP produces the *Constraint Management Model* (CMM) for strategy development and deployment (Dettmer, 2003). It's so named because the LTP was derived from the effort to apply TOC to whole systems, and in using the LTP to develop and deploy strategy the management of constraints is a natural byproduct. In other words, you can't effectively execute whatever strategy you might develop without identifying and breaking your existing system constraints. Figure 19-9 illustrates the CMM.
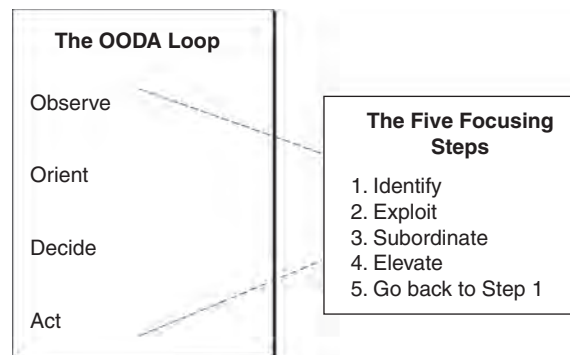

The OODA Loop

Observe

Orient

Decide

Act

The Five Focusing Steps

1. Identify
2. Exploit
3. Subordinate
4. Elevate
5. Go back to Step 1

FIGURE 19-8   OODA loop and the Five Focusing Steps.

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[8]A cybernetic system is one that is affected by environmental shifts but has the means through feedback control to continue to meet system objectives. Additionally, a cybernetic system's objectives are not rigidly fixed but are adaptable to changing conditions and responsive to new understanding. Cybernetic systems gain from experience and thus exhibit learning (Athey, 1982).
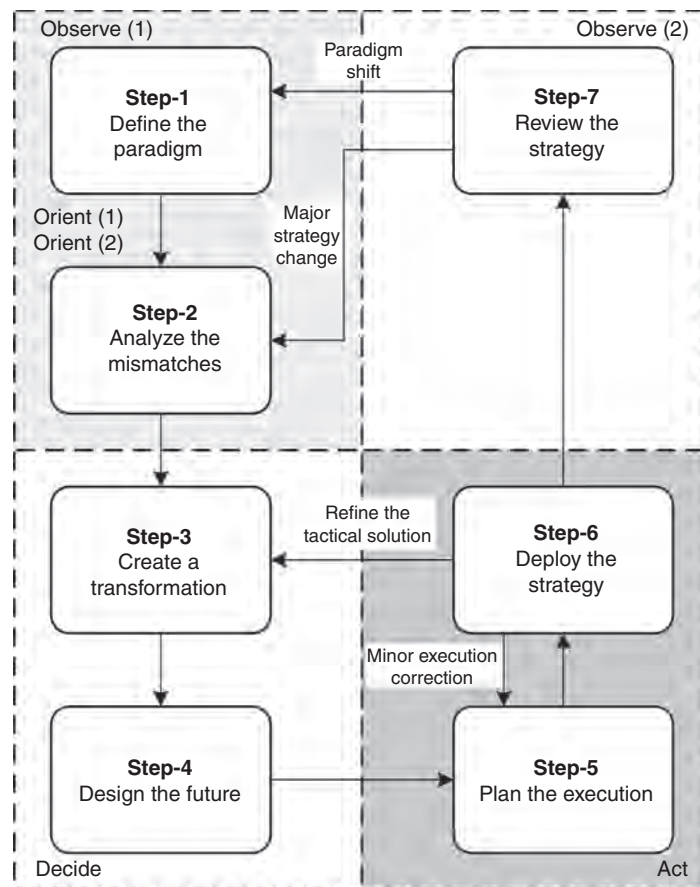
Figure 19-9 The constraint management model. (*From Dettmer, H. W.* 2003. *Strategic Navigation: A Systems Approach to Business Strategy. Milwaukee, WI: ASQ Quality Press.*)

The CMM is, itself, a seven-step cyclical process.

Step 1. Define the paradigm. The first step in any strategy development process should be to define the system, its goal and CSFs, and the characteristics of the environment in which it operates. This is where the first three levels of the IO Map are developed. Besides some serious conceptual thinking, this naturally requires both internal and external observations to be made—the first step in the OODA loop.

Step 2. Analyze the mismatches. Once the system and its operating environment are defined and observations of the current situation made, it's time to synthesize what *should be* happening with what *actually is* happening. This synthesis is the essence of Boyd's *orientation* step in the OODA loop. The product of this synthesis is one or more gaps, or what Boyd referred to as "mismatches." In this case, the mismatch is between reality and our expectations. The size and scope of such gaps are specifically articulated. Inevitably, a system's current constraint will be found somewhere within the identified mismatches.

Step 3. Create a transformation. This is essentially a "brainstorming" step. It's the point in the process where creativity is required—thinking "outside the box" to create breakthrough

ideas. Such ideas must be created before any decisions about what to do can be made. "Creation" is an inspirational or inventive activity. There are several widely used idea-generation methods, such as TRIZ (Rantanen and Domb, 2002), that can contribute break-throughs in thinking needed to close the gaps discovered in Step 2.

Step 4. Design the future. Once a breakthrough idea (or more than one) is created to close the gap defined in Step 2, it must be integrated into a whole-system plan that includes not just the changes to close the gap, but the continuing operations that had no mismatches associated with them. Hypothesis testing, whether in the form of a simulation, prototype, or just a logical verification, verifies the efficacy of various alternatives, from which one or more are selected. This is the essence of the decision step in the OODA loop.

Step 5. Plan the execution. Once the decision is made, an execution plan should be formu-lated, since "the devil is in the details." Resources, accountabilities, timelines, and measures of success are established in execution planning. (If this is beginning to sound like a project, it's because it *is!*) An execution plan represents the "front end" of the OODA loop's *act* step.

Step 6. Deploy the strategy. This is the conclusion of the *act* step. How long the execution actually takes will depend on the nature of the activities planned. Strategies are typically longer-range than business plans or tactical actions. Time horizons are often measured in years. However, the completion of Step 5 makes managing deployment better structured and easier to monitor. Moreover, as the inevitable surprises, deviations, or unexpected vari-ations occur in execution, the plan can be expeditiously corrected to accommodate them. This is the second half of the OODA loop *act* step.

Step 7. Review the strategy. Presuming that no major breakdowns in strategy deployment occur, the only remaining task is to evaluate the strategy's overall effectiveness. This obvi-ously brings us back to the OODA loop's first step again—*observe*. This time, however, we're not looking for deviations in deployment. We're determining whether the overall strategy we developed in Step 4 is really producing the results we want and expect.

Step 7 includes two feedback links. The more common one connects to Step 2 again (analyze the mismatches). Working with our previously defined paradigm and expectations (established the first time through the OODA loop in Step 1), we compare the second round of observations with our original expectations.[9] Have the gaps identified earlier narrowed or even closed altogether? If not, or if they're not closing quickly enough to suit us, we must reevaluate our strategy and adjust it as necessary. Even if the gaps have closed, a proactive application of the OODA loop requires that we identify and develop "the next big thing" in our chosen field of operation. For example, Sony didn't sit on their Diskman® audio players or Trinitron® televisions after they stormed the market with them. They immediately began working on an MP3 player and a flat-screen video display. *That's* being proactive. The sec-ond, and less obvious, feedback loop takes us through Step 1 again. This is likely to happen much less frequently than the other feedback loop. This particular loop implies that a com-plete reexamination (and perhaps redetermination) of goals, critical success factors, and the external environment is required. In other words, it's possible that dramatic change in the external environment of such magnitude has precipitated a complete redesign of strategy. What kind of event might this be? How about an economic depression or some catastrophic event such as a world war? Take Toyota, for example (Holley, 1997). Originally (before World War II), it was a manufacturer of textile machines. By the end of that war, its surviving manufacturing base had been completely converted to *automotive* vehicles, at the insistence of the Japanese Imperial Army. That was a conversion forced on Toyota by circumstances. However, by 1997 Toyota was anticipating that within 100 years the automobile segment of

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[9]It's highly desirable to capture baseline figures, statistics, and other data in the first iteration of the *observe* step to facilitate effective detection of change in the second iteration of observation. Too often, this is neglected in actual practice.

their business would constitute no more than 10 percent of the total. The rest would be in low-cost prefabricated housing and information systems. *These* are strategic shifts—proactive ones.

The Role of the LTP in the CMM

How does the LTP fit in with the CMM? The preceding description of the CMM fairly begs for a structured tool to make Steps 1 through 5 happen. That tool is the LTP. Figure 19-10 shows how the LTP energizes the CMM.

The IO Map is used to establish the benchmark of expected or desired performance. For an organization that already understands that it's not yet where it wants to be, the articulation of the goal and CSFs in the IO establish a "stake in the ground"—the destination marker that determines where the organization wants to be at the end of the strategy's time horizon. Supporting necessary conditions represent the high-level functional milestones that must be achieved to reach the goal. Inherent in the development of the IO Map are research, observations, and information gathered about the external environment.

With the IO Map as the entering argument (desirable state), a CRT[10] is constructed to depict the relationship between reality and the end results depicted in the IO Map. The resulting gaps are reflected as *undesirable effects* (UDEs). The construction of the body of the tree, down to the critical root causes, embodies the synthesis (or orientation) of newly acquired knowledge about the external environment with experience, expertise, custom, tradition, etc.—the existing paradigm, if you will. The CRT produces the logical causes of the gaps (UDEs), without regard to whether they are politically acceptable to consider changing.

Especially in the latter situation, the transformation created in Step 3 is facilitated by the use of *Evaporating Clouds* (ECs), which are specifically designed to resolve intractable dilemmas such as political feasibility. The output of the ECs, and the beginning of this transformation process, is one or more injections that represent breakthrough ideas. These ideas become *initiatives,* or new projects that will provide the impetus to move the organization from where it is to where it wants to be. Some of these initiatives (changes) will undoubtedly be externally focused. Others will be inwardly directed.

The *Future Reality Tree* (FRT) takes these initiatives, or ideas, and logically structures them to verify that, in fact, they will move the organization toward its ultimate goal. The reflection of that movement is in the narrowing, or complete closure, of the gaps identified in Step 2. This narrowing/closure is represented as a *desired effect* (DE) in the FRT. Besides logically verifying that the initiatives created will, in fact, advance the organization toward its ultimate goal, the FRT will include the "ferreting out" of negative branches—those conditions under which the whole strategy deployment (or key aspects of it) might be derailed. The "trimming" of these negative branches becomes contingency plans. The completed FRT, with trimmed negative branches, *is* the organization's strategy. The FRT injections are the strategic initiatives, programs, projects, etc. required to impel the organization toward its goal.

Once the strategy is developed in Step 4 as the second part of the *decide* stage in the OODA loop, the *action* stage naturally follows. Step 5 is the detailed execution planning. Each of the injections, or initiatives, defined and verified in the FRT (Step 5) is "fleshed out" in a *Prerequisite Tree* (PRT). Obstacles are overcome and important milestones and sequential/parallel tasks are identified. The resulting PRT forms the basis of a project plan—a project

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[10]Other chapters in this Handbook provide guidance on constructing CRTs. *The Logical Thinking Process* (Dettmer, 2007) provides step-by-step explanation and instructions not found elsewhere specifically for integrating the IO Map with the CRT.
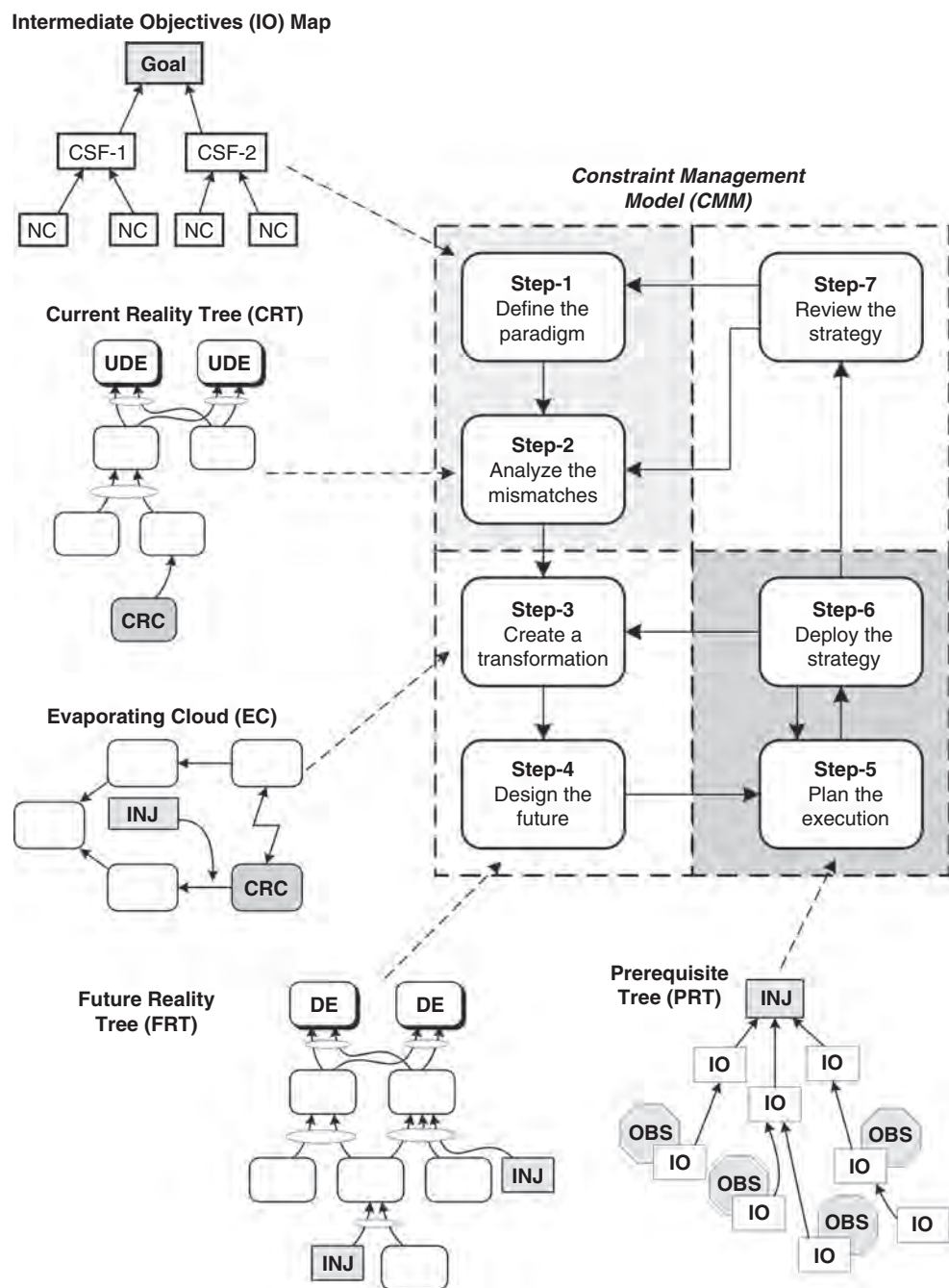
Intermediate Objectives (IO) Map

Current Reality Tree (CRT)

Constraint Management Model (CMM)

Evaporating Cloud (EC)

Future Reality Tree (FRT)

Prerequisite Tree (PRT)

FIGURE **19-10** The logical thinking process and the constraint management model.

activity network—that can be managed using *Critical Chain Project Management* (CCPM). The consolidation of all PRTs into multi-project CCPM becomes the organization executive's tool for managing the overall long-term deployment of the strategy.

What about Steps 6 and 7?

The natural question at this point is, "But what about Steps 6 and 7 of the CMM?" The answer is that at the conclusion of Step 5, the role of the LTP ends. Strategy deployment (Step 6) is an ongoing leadership responsibility. Effective executives use a variety of tools and techniques to shepherd a deployment along. If the execution planning in Step 5 included conversion of PRTs to a CCPM schedule, then one of the obvious TOC-related tools a leader might use at this point is *Buffer Management* (BM).

Step 7 is an executive function, too. It requires a conscious, deliberate effort to repeat the *observe* step of the OODA loop again with the objective of identifying failure of the strategy to deliver the intended results and the reason for that failure. In many, perhaps most, cases such failure has less to do with the inadequacy of the strategy than it does a rapid, possibly catastrophic shift in the environment. How many perfectly good strategies do you think might have been rendered ineffective by the 9-11 terrorist attacks in 2001, or the collapse of the U.S. economy in 2008? Even if the triggers are not quite so dramatic, such environmental changes can prompt a need to reevaluate and adjust strategies—or even replace them altogether. And so begins the second iteration of the OODA loop with a return to the IO Map and CRT.

Summary and Conclusion

Formal strategic planning in business dates back only to about 1965, although the development and employment of strategy have been practiced since the days of Sun Tzu some 2500 years ago. In contemplating strategy, there are some worthwhile points to keep in mind.

- Distinguish between the development of strategy and a strategic plan. The latter is no more than the capture in some written form of the former. Strategy development, not the written plan, should be the primary focus.

- For businesses, strategy is about far more than just marketing and sales. It's concerned with the long-term attainment of the organization's goal. If that organization is a commercial company, Marketing and Sales will be but one part of that effort.

- Organizations live or die as complete integrated systems, existing in an external environment that imposes conditions, including competition, on the activities of the system. Effective strategy must consider both the internal activities and the external environmental factors.

- The OODA loop developed by Boyd provides an excellent foundation for managing the development and evolution of strategy over the foreseeable time horizon of an organization. (It should be emphasized, however, that the OODA loop is only one small but important part of Boyd's contributions to systemic thinking. The sources on Boyd listed in the references are all highly recommended reading.)

- The LTP is perhaps the most powerful system-level policy analysis tool ever conceived. Strategy development and refinement is very much concerned with policy analysis, since strategic prescriptions inevitably take the form of policies to some degree. Consequently, the use of the LTP as a strategy development and deployment tool can't be reinforced too strongly.
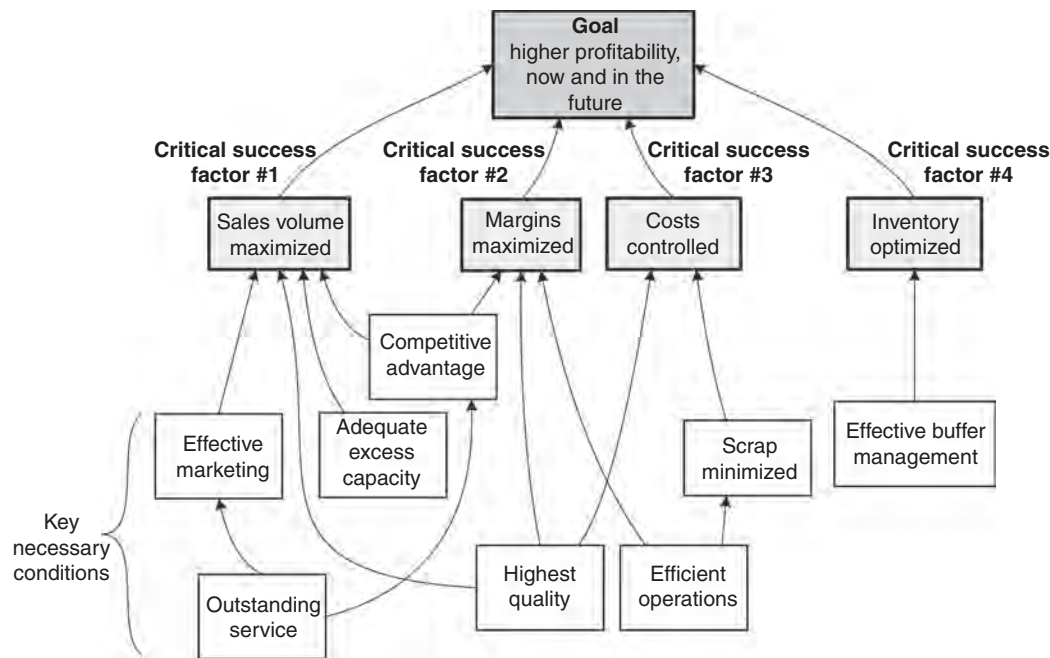
FIGURE 19-11   All Form Welding Company strategic intermediate objectives map.

- Merging the framework provided by the OODA loop with the trees of the LTP provide a "power boost" for organizations of any stripe—commercial, not-for-profit, or government agency—in helping them achieve their goals. If such organizations exist in a "zero sum" environment (a gain for them is a loss for some other group), this kind of assist can spell the difference between success and failure.

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William Dettmer is senior partner at Goal Systems International, providing consulting and training on established applications of constraint management tools in both manufacturing and services with Fortune 500 and other companies. He has developed new applications for constraint theory, principles, and tools. Dettmer has deep experience in logistics, project planning and execution, and contracting/procurement and has had direct responsibility for project management, logistics planning, government contracting, system design, financial management, productivity improvement, idea generation, team building, strategic planning, and customer-supplier relations. He is the author of seven books on constraint management and system improvement.