To better maps: A TOC primer for strategic planning

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Recently, many practitioners and scholars of strategy have challenged the universal appeal of the traditional strategic concepts and agree that the discipline is at the point where new models of the strategy process should be explored. Here is such a model. The thinking process tools of the theory of constraints are described and applied to the case of defunct airline People Express in order to illustrate how they might be applied to strategic planning. The implications of these thinking processes for other strategic management issues should be of help to managers charged with developing the "maps" for their respective destinations.

Perhaps the most common metaphor applied to business is that of a journey. A business owner or professional manager targets a destination—product development, profit, market share, revenues, competitive niche—and begins the arduous trek to arrive at that destination within a specified time and budget. The trek is fraught with threats, both expected and unexpected, and opportunities, some of which are realized and others not. Given the intuitive appeal of the business as journey metaphor, we should not be surprised that the strategic planning process is often characterized as creating a "map" of that destination.

Weick's (1979) provocative and insightful critique of the strategic planning process highlights this map analogy in his intriguing story about a small detachment of Hungarian troops. While engaged in maneuvers in the Alps, the troops lost their bearings during a violent and unexpected blizzard. They were about to give up and accept imminent death when one of the soldiers found a map in his pocket. Using the map, they were able to find their way back to their base. To their surprise, they later discovered that the map was not of the Alps but the Pyrenees.

Weick interprets this story as demonstrating the importance of a strategic plan fitting reality as that reality is both confronted and enacted. Planners must make sense of real-time data within the context of the larger strategic goals they are trying to achieve. "The soldiers were able to produce a good outcome from a bad map because they were active, they had a purpose (get back to camp), and they had an image of where they were and where they were going," says Weick. "They kept moving, they kept noticing cues, and they kept updating their sense of where they were. As a result, an imperfect map proved to be good enough."

Strategic planning and imperfect maps

There is little doubt that strategic planning is an imperfect process resulting in imperfect maps. Over the past two decades, scholars have highlighted these imperfections

and suggested approaches and techniques for improving the process. For example, Mintzberg and his colleagues have written two influential books, *The Rise and Fall of Strategic Planning* (1994) and *Strategy Safari* (1998), both of which argue for dynamic models of planning and emphasize the importance of intuition. According to these works, "the black box" of strategic planning has yet to address the most important planning element: strategy creation. In short, logic provides us with SWOT analysis (strengths, weakness, opportunities, and threats) and Five Competitive Forces (suppliers, customers, rivals…), but not with prescriptive approaches for the inspiring idea that saves a faltering business or launches a new venture.

Other scholars, such as Peter Senge (1994) and Kathleen Eisenhardt (1999), argue that an underlying problem with traditional approaches to strategy is that they ignore the importance of mental models in both formulation and implementation. Senge notes that "new insights fail to get put into practice because they conflict with deeply held internal images of how the world works." He adds that "two people with different mental models can observe the same event and describe it differently, because they've looked at different details." Eisenhardt says that effective decision makers create strategy by "building collective intuition that enhances the ability of a top management team to see threats and opportunities sooner and more accurately." This raises the question: How can managers build common mental models? In other words, how can they develop collective intuition?

Eisenhardt observed 12 firms, half of which were considered successful strategy makers and half of which were not, and noted that effective strategists used a decision process that included regularly scheduled, intensive "don't miss" meetings to discuss extensive real-time information on both internal and external operations. These executives also accelerated constructive conflict, maintained decision pacing, and avoided politics. In an article discussing the importance of changing management's collective cognition in strategic change, Mezias, Grinyer, and Guth (2001) set out a process model for strategic change involving top management commitment, a holistic approach, a change agent, a neutral site, group factors, and awareness of execution issues during strategy development.

Neither Eisenhardt nor Mezias et al. provide detailed guidelines for the process of developing shared mental models. So what exactly do you do in top management meetings to ensure that everyone comes away with and buys into a common understanding of the situation and what must be done? Is there an approach that would provide more structure and, at the same time, be directed toward the goal of improved strategic ideas? Our purpose here is to highlight and summarize one approach, based on Goldratt's theory of constraints (TOC), that provides that structure and thus improves our strategic maps.

The theory of constraints as an innovative alternative

According to Gupta (2003), the theory of constraints thinking processes originated in techniques developed more than 20 years ago by Eliyahu Goldratt to improve plant operations. The TOC has two broad viewpoints: that of the business system, and that of an ongoing improvement process.

The business system perspective

The techniques described in Goldratt and Cox's (1984) *The Goal* are based on the concept that all complex systems have at least one factor, and at most a very few factors, that limit their performance at any one time with respect to the system's goal of making money. In the case of a manufacturing company, such factors might include limited capacity on a particular machine, or limited availability of a particular raw material. Managing and improving a business system means implementing a change process at three levels: the *mindset* of the business unit, the *measures* that drive the functional areas, and the *methodology* used to manage resources and improve processes. The focus of these "3Ms" is the system's constraint, and the key to managing and improving the system is to identify and make the best use of the constrained resource. While the concepts and techniques described in *The Goal* led to dramatic improvement in manufacturing operations, TOC suggests that limiting factors are usually not resources but policies, procedures, and measures—in other words, non-physical constraints.

The process of ongoing improvement perspective

Goldratt developed the thinking process tools to deal with these more general problems and demonstrated their application in a subsequent book, *It's Not Luck* (1992). The thinking processes address three questions: (a) What to change? (b) What to change to? and (c) How to cause the change? Goldratt argued that the tools, which are based on cause-and-effect logic, provide a structured method for accessing management's intuition to solve business problems. This feature directly addresses one of the failings of typical strategic planning approaches: the fact that intuition is minimized or disregarded in the process. Applications of the TOC thinking process tools to operations (Cox and Spencer 1998), marketing (Kendall 1998), and strategic management (Dettmer 1997; Boyd et al. 2001) have appeared in the past few years.

TOC thinking processes applied to strategic planning

Two of the three questions addressed by the TOC thinking process tools match up directly with traditional approaches to strategic management. A company that is performing a

situational analysis as part of its planning is answering the question "What to change?" And strategy implementation is clearly answering the question "How to cause the change?" However, the most critical question in strategic planning, the one answered in the black box, is "What to change to?" In addressing this question, the real power of the thinking process for strategic planning becomes clear. The relationship between those tools and existing strategic management tools is shown in **Figure 1**.

The best strategy vs. a practical strategy—an important caveat

TOC assumes that no matter what methodology strategic planners use, they are searching for ideas to address issues of change. A good or practical strategy is one that can be implemented and will lead to improvement, or bring a business unit closer to its goal. Based on his extensive experience in implementing TOC-based strategies, Kendall argues that even practical strategies encounter difficulties in obtaining agreement due to conflicts among the management team. Conflicts such as those between short-term and long-term strategies, between making money in the future and satisfying customers, and between creating a pleasant, secure environment for employees and maximizing profits can be at the root of major management disagreements.

The TOC thinking processes provide a systematic way to find a feasible, implementable strategy, though not necessarily the "best" one. Using the 3Ms, a management team can focus on high leverage points and ensure the financial success of the business unit as a whole. The thinking processes allow the management team to determine in advance whether any one strategy is likely to succeed.

Bear in mind that in using the thinking process tools of TOC, there is no one right or best answer. Strategy development is fundamentally a creative process—the future is not something already existing out there that we have to find. In Weick's terms, we enact the future. The thinking

processes provide a structured way for management to tap into its collective intuition to determine a course of action. Different sets of managers will have different make-ups, including ability and experience; they will therefore have different intuitions and can come up with quite different strategic paths using the same tools.

Applying the thinking processes: People Express

The case of People Express has been widely used to illustrate a variety of issues in strategic management. Thompson and Strickland (1999) use it in their popular textbook. Harvard Business School published the case in 1983 and followed it up with a number of supplements. The case is useful because it highlights human resource, marketing, operational, and strategic issues, and includes a number of critical decision points. Here we use it to introduce the use of the TOC thinking process tools for strategic management and show how they reach beyond theory to apply to business decisions. The analysis was done by our research team using these tools, not by People Express or its management. Nor do we claim that had PE done a similar analysis, it would not have gone out of business.

Why People Express? Why not Southwest Airlines?

An excellent and well-known airline industry case we might have chosen instead is Southwest Airlines. Southwest has been covered extensively by the business press for a number of years, and the company is considered even more remarkable now that it is the only profitable major air carrier. However, we did not use Southwest for two reasons. The first is that a successful company is harder to learn from than a failed one. This has been shown over several decades by Toyota, famous for its Pro-

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Figure 1
Matching the theory of constraints with existing strategic management tools

	Analysis	Formulation	Implementation
Strategic management tools	**Analysis** SWOT analysis Five-forces model	**Formulation** Black box	**Implementation** Short-term objectives, policies, tactics, & rewards
Theory of constraints tools	**What to change?** Current reality tree (CRT)	**What to change to?** Evaporating cloud (EC) Future reality tree (FRT)	**How to cause the change?** Prerequisite tree (PrT) Transition tree (TrT)

duction System. Toyota does not mind showing everyone its system because it is confident that, although the system appears to be simple, to copy it would be so complex and dependent on so many factors that it could not be done. Southwest's approach is a consistent, company-wide system, all the parts of which fit together to produce a unified whole. To attribute its success to any one factor would be unrealistic. With People Express, on the other hand, there are several key decisions and conditions to which the company's downfall can easily be traced. An analogy might be made to a living organism: Because of its complexity, it is much easier to explain what causes an organism to fail than to explain how it manages to function well in a hostile environment.

The second reason for choosing People Express rather than Southwest is that it is easier to avoid the logical fallacies of coincidental correlation, also referred to as the post hoc fallacy: "After this, therefore because of this." For example, it might be argued that Southwest is successful because it turns its planes around faster than other carriers. But although it is hard to argue that Southwest's proficiency in turning its planes around does *not* contribute to its success, it is difficult to say whether it is a minor or major factor. One might even play devil's advocate and suggest that Southwest might be more successful if its turnaround times were slower. In any successful complex system, these questions are difficult to answer. People Express, because it failed, provides opportunities to learn that we would not have with Southwest.

Synopsis of the People Express case

PE was organized and founded by a group of entrepreneurs to create a new approach to commercial air travel. Its goal: to be the low-cost, no-frills airline of choice in small, underserved markets where the major airlines did not readily compete. According to its 1980 IPO prospectus, Don Burr, the founder, strongly believed that people are happier and more productive when challenged, and he made a conscious decision to run a flat, lean organization in which employees were expected to be largely self-managed and perform a range of duties. Burr attempted to create a working environment conducive to personal responsibility, accountability, and commitment. Every new employee went through an orientation at which Burr explained the company's philosophy.

From its first commercial flights on April 30, 1981, PE expanded from some 250 employees, three Boeing 737s, and routes serving four cities with 24 flights a day to over 4,000 full- and part-time employees, 49 planes, and more than 320 flights daily to 20 destinations, including London. Every quarter from second quarter 1982 through third quarter 1984 was profitable. In late 1982 and early 1983, PE raised $28 million for future expansion through a second stock offering and obtained a line of credit for

$22.5 million from Bank of America in order to acquire additional aircraft.

If PE's growth had its benefits, it also had its costs. In September 1982, a year and a half after PE began service, a University of Michigan survey of PE employees revealed that "people are feeling frustrated with their work, cross-utilization is not being well-received, management is viewed as less supportive." A significant number of customers were also unhappy. This was a critical decision point for Don Burr and People Express. It was clear that something needed to be done to alleviate the problems at hand as well as move the company in a viable direction.

Competition in the deregulated airline industry had become more and more intense, with major airlines such as American cutting their fares below PE's. Seeing fast growth as a strategy for remaining competitive, Don Burr led PE into a period of rapid expansion by making large investments in airplanes and acquiring a series of airlines. In fiscal 1985, PE reported a loss of $27.5 million. In June 1986 came the announcement that all or part of the company was up for sale.

Situational analysis → the current reality tree (CRT)

The first step of the strategic planning process is using the *current reality tree* tool of the thinking processes, which uses cause-and-effect logic in conjunction with the tree builder's intuition to identify a system's core problem—the answer to the question "What to change?" The first step in constructing the CRT is making a list of problems or symptoms in the current situation; in SWOT terms, this list of problems might be viewed as a list of weaknesses and threats. Problems are referred to as undesirable effects (UDEs) because they are generally effects or symptoms of a less obvious problem. Some of the UDEs, or symptoms, of the People Express case are:

1. Some customers are unhappy.

2. Some employees are becoming ill and suffering burnout.

3. Management is seen as less supportive than in the past.

4. Employees are feeling frustrated with their work.

5. Senior managers are having trouble coping with their work loads.

Any two of the UDEs that appear to be causally related can be selected to start the tree. In many cases, one entity by itself is insufficient to cause another; the cause must be combined with another statement about current reality to establish the causal relationship. For example, in **Figure 2**, entities 251, 255, and 256 have arrows pointing to 260. The ellipse crossing the arrows means that none of the three entities alone is sufficient to cause 260, but all three together are. In this case, the fact that management is

viewed as less supportive is not enough to cause employees to feel frustrated with their work, because other positive factors may be nullifying the effects of the non-supportive management perception. However, if management is viewed as less supportive *and* employees are overworked and performing poorly, then employees will feel frustrated with their work.

The completed CRT of the PE case consists of approximately 60 entities. But because of space limitations, only a portion of it is shown for illustrative purposes. (The complete CRT is available from the authors upon request.) Although the CRT is built from the top (the UDEs) down to the core problem, it is read from bottom to top, from causes to effects. Entities in gray boxes are the undesirable effects from the numbered list above. Other entities were added in the construction of the tree to complete the logic. However, the completed CRT contains the following entity near its base: "PE's human resources strategy focuses on cross-training, self-management, and challenge-driven motivational techniques." On the surface, this entity does not appear to be a problem at all. In fact, the statement sounds like what many would consider a potentially successful HR strategy. On examining its effects in the CRT, however, we observe that this strategy, in conjunction with other aspects of PE's current reality, led to many of the undesirable effects the company experienced in October 1982. It is, in fact, a core problem—an entity that, if eliminated, would cure at least 70 percent of the UDEs that appear above it in the tree. While certain aspects of PE's HR strategy were clearly crucial to its success up to October 1982, at that point, and according to the CRT analysis, it was causing a number of serious negative consequences that were threatening the existence of the business. The UDEs shown in Figure 2 are examples of these consequences.

Core problems often persist not because no one realizes that they are problems but because one person or department does not have the power to fix them. In other words, they persist due to an unresolved conflict—a situation in which different parties have conflicting requirements and prerequisites, and neither has the power to impose a solution on the other. There is evidence of such conflict at PE: Three top executives, including the personnel chief, ended up leaving the carrier over the ensuing few years.

Figure 2
A portion of the People Express current reality tree (CRT)
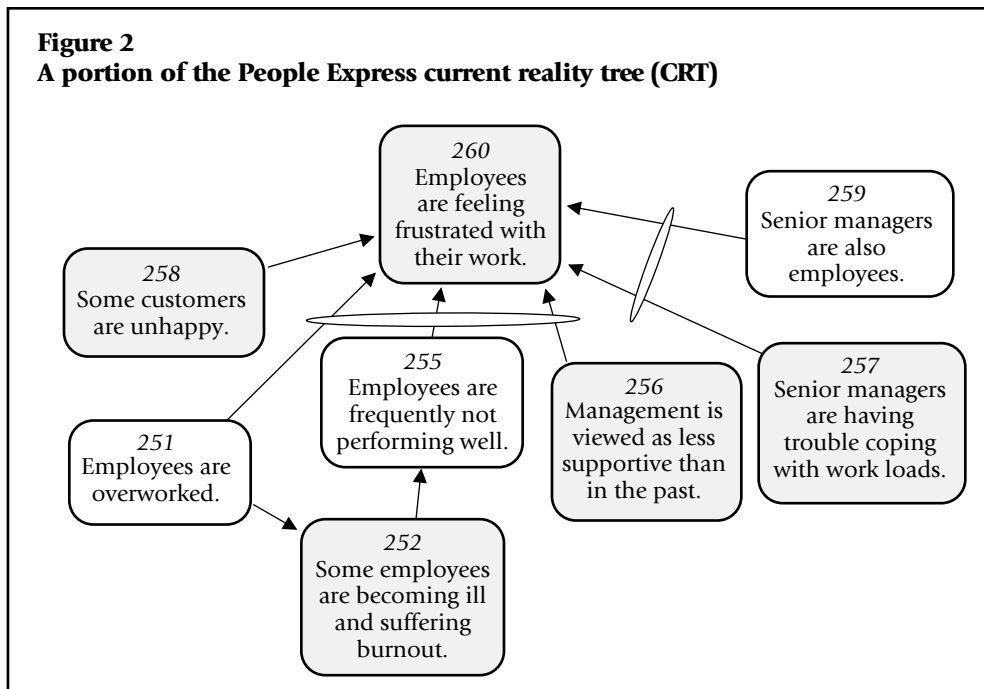
The CRT allows us to analyze a situation and use cause-and-effect logic to identify the core problem(s). The specificity needed to formulate a strategy to solve the problem(s), however, does not come out of the current reality tree but from the next step: the evaporating cloud.

Strategy formulation → the evaporating cloud (EC)

The second step of the strategic planning process, strategy formulation, is often regarded as a black box because it is difficult to prescribe the creative formulation process. But the thinking process tool known as the *evaporating cloud* can be used to illuminate the black box. Although the EC is most frequently used as an independent tool, it is also an integral part of the thinking processes. A major part of building an EC is to bring hidden assumptions to the surface, which is also a key to formulating strategy. Exposing assumptions often leads directly to an innovative solution—an "injection," which is a breakthrough idea that can be injected into the current situation to resolve, or "evaporate," the conflict.

The logic of the cloud is that to achieve the common objective, each party's requirements must be satisfied, but their specific prerequisites may not be. The purpose is to develop win-win solutions to such conflicts, thereby eliminating the core problem. A win-win solution is one in which each party's requirements are satisfied but prerequisites are challenged by exposing underlying assumptions and proving one or more of them to be invalid.

The first step in creating an EC is to find a common *objective* that both parties of the conflict can agree on. It is, in a

sense, the opposite of the core problem. Thus, to construct a cloud for the People Express case, we start with the opposite of the flawed HR strategy: a *viable* HR strategy. However, it is clear that this by itself does not guarantee long-term success for PE. Therefore, it is obvious that implementing a viable HR strategy must coincide with viable operational, marketing, and other functional strategies, all of which stem from the grand strategy laid out by the company as a whole.

The next step in building an EC is identifying the *conflict* that prevents the cloud's objective from being achieved. Dettmer suggests that it is helpful to recognize two types of conflicts: (1) *opposite conditions,* in which one force pushes us to "do this" while the other force pushes us to "not do this" (in the PE case, a conflict between hiring or not hiring more people); and (2) *different alternatives,* in which we are forced to choose between two alternatives that are not opposite conditions but are, for some reason, mutually exclusive (in the PE case, a conflict between using employees to hire more people or using employees to operate planes). The latter type is a classic case in which a conflict may not be obvious. According to Dettmer, one way to confirm that a hidden conflict may be causing a core problem is to analyze how management spends its time, because a hidden conflict may consume as much as 50 percent of time and energy. Here, we have selected the latter type of conflict to illustrate the construction of the EC.
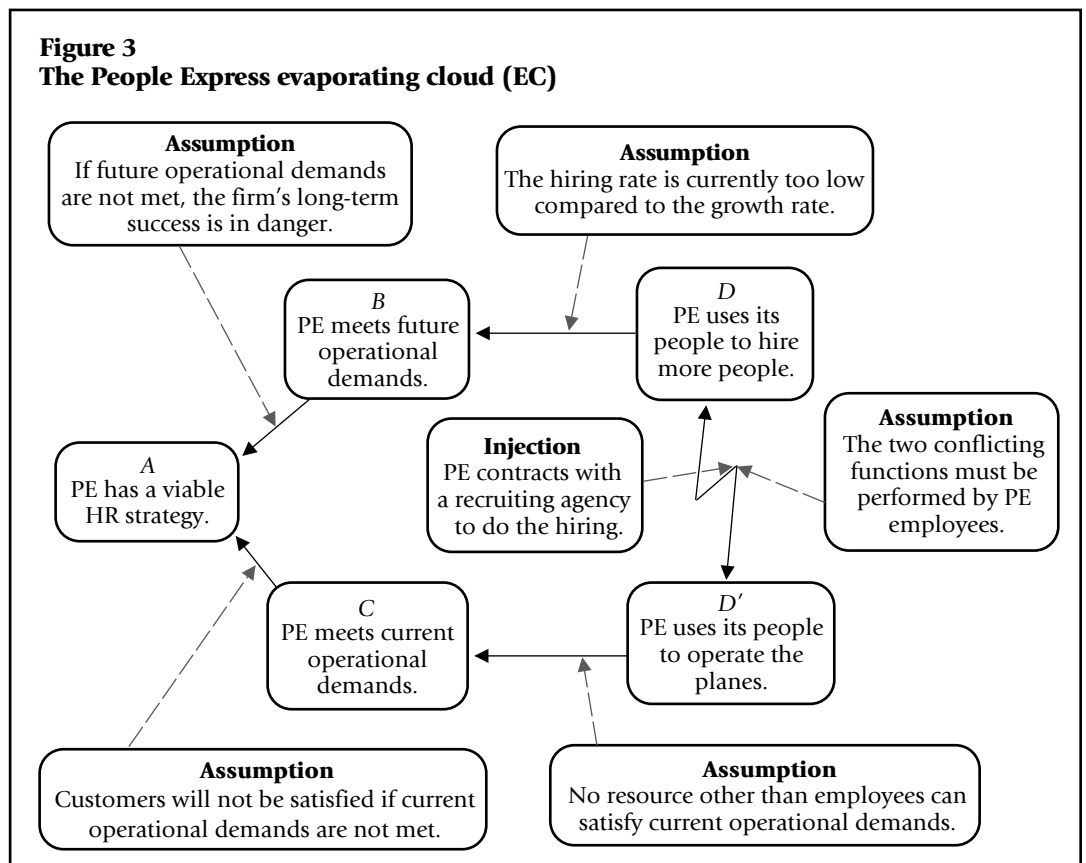
process did in fact take employees away from other operational duties.

Once the objective and conflict are identified, the question is: What requirements are the parties to the conflict trying to satisfy? By using its people to hire more people, PE was trying to meet future operational demands. On the other hand, by using its people to operate the planes, PE was trying to meet current operational demands. Once the requirements are identified, the cloud can be constructed as shown in **Figure 3**.

The top side of the EC is read from left to right in the following format: "In order to have (Objective A), we must have (Requirement B). In order to have (Requirement B), we must have (Prerequisite D)." In this case, the cloud would be read: "In order to have a viable HR strategy, we must meet future operational demands. To meet those demands, we must use our people to hire more people." The bottom of the cloud is read the same way, also starting with the objective. The conflict arrow (between D and D') is read: "On the one hand, we must use our people to hire more people. On the other hand, we must use our people to operate the planes."

Underlying each of the arrows in the cloud are assumptions. In many cases, they are valid; however, if we do a thorough job of identifying or exposing assumptions, we can identify some that are not valid, or for which we can

This conflict between using employees to hire more people or to operate planes was a very real problem for PE. The complete CRT provided an explanation: Burr's philosophy was based on challenging employees to the utmost, but not all potential employees responded well to the type of pressure this created. So PE had to be very selective in its hiring, which made the hiring process quite labor-intensive. Moreover, as indicated by entities on the complete CRT, Burr believed strongly in cross-training employees, and all those except pilots rotated jobs in the early stages of the company's growth. Because of this policy, the hiring
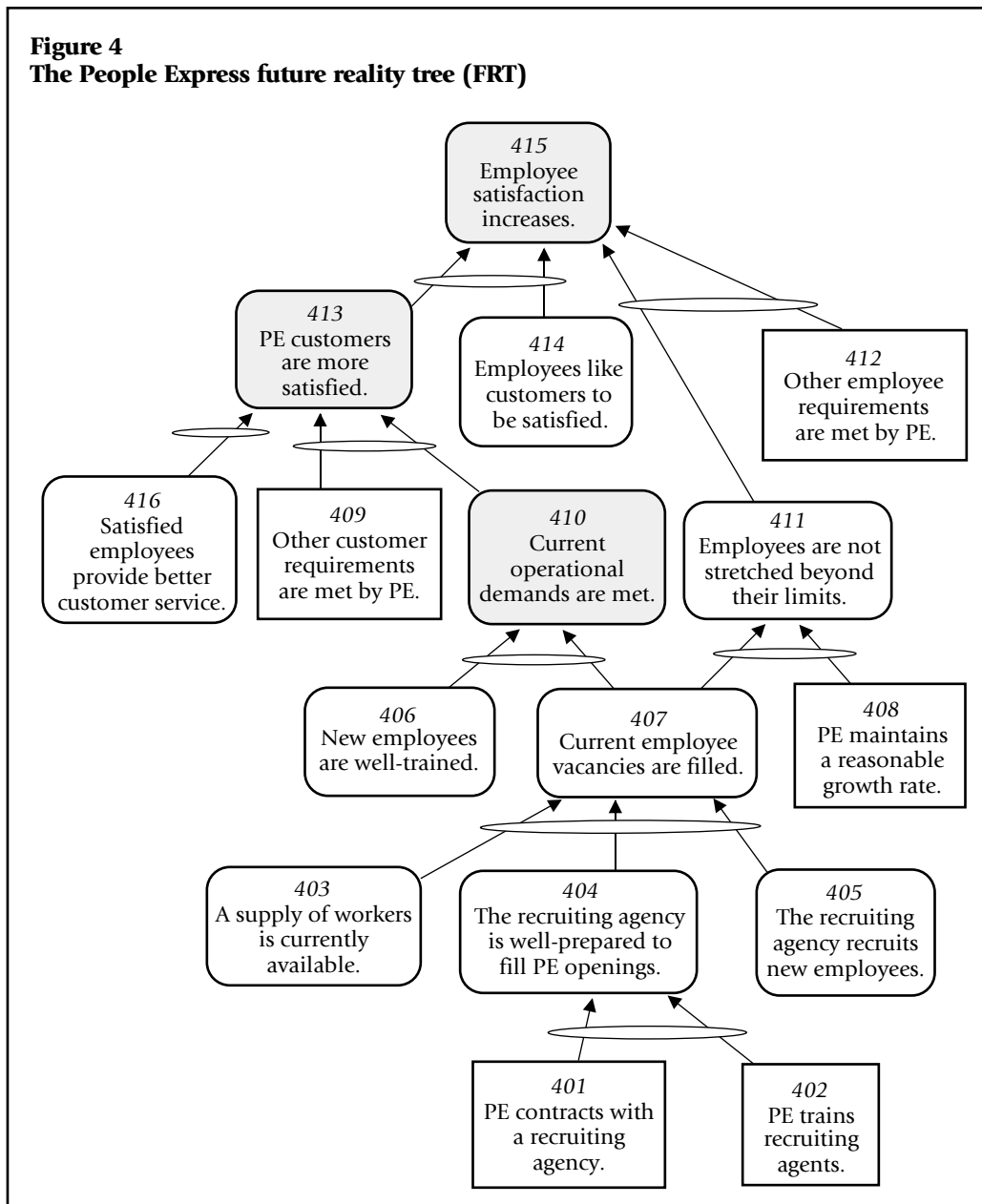

Figure 3
The People Express evaporating cloud (EC)

think of an injection that will invalidate them. One technique commonly used to expose assumptions is to complete the sentence: "In order to have (Objective A), we must have (Requirement B) because.…" The phrase following the word "because" is an assumption underlying that relationship in the EC. Figure 3 lists at least one assumption for each arrow on the cloud together with a potential injection. For example, the assumption underlying the A–B arrow would be read: "In order to have a viable HR strategy (A), we must meet future operational demands (B) because if future operational demands are not met, then the firm's long-term success is in danger." The injection "PE contracts with a recruiting agency to perform the hiring function" might reasonably be taken to ensure that PE has a viable HR strategy. The next step in the thinking process is to test the injections using the future reality tree to ensure that they result in desirable effects without creating new undesirable ones.

From a conventional point of view, it might be argued that contracting a recruiting agency is a tactical rather than a strategic decision. But the TOC does not distinguish between these decision levels; it addresses whatever the limiting factor is at each point in time. In the PE case, an HR issue happened to be the company's core problem at a critical point in its history. Although this issue was not strategic in the normal sense, it had a significant impact on the company's outcome. Later in PE's history, Don Burr and the management team made a decision that would fit the conventional definition of strategic—the purchase of Frontier Airlines. This type of strategic decision might also have come out of the EC. Whether generated through the cloud or not, such major proposals need to be tested before implementation using the future reality tree.

Figure 4
The People Express future reality tree (FRT)

415 Employee satisfaction increases.

413 PE customers are more satisfied.

414 Employees like customers to be satisfied.

412 Other employee requirements are met by PE.

416 Satisfied employees provide better customer service.

409 Other customer requirements are met by PE.

410 Current operational demands are met.

411 Employees are not stretched beyond their limits.

406 New employees are well-trained.

407 Current employee vacancies are filled.

408 PE maintains a reasonable growth rate.

403 A supply of workers is currently available.

404 The recruiting agency is well-prepared to fill PE openings.

405 The recruiting agency recruits new employees.

401 PE contracts with a recruiting agency.

402 PE trains recruiting agents.

Strategy formulation (continued) → the future reality tree (FRT)

The injection identified in the EC can be implemented directly in many cases. Once it is identified, it will resolve the core problem and eliminate the UDEs without creating significant new ones. However, when considering strategic issues or major policy changes, it may not be clear that the proposed solution will solve the problem, or that serious unintended consequences will not arise. In this case, the *future reality tree* (**Figure 4**) would test the injection from the EC by putting it at the base of the new logic tree and, using the same cause-and-effect reasoning as in the CRT, identifying all the consequences of the

action, both good and bad. Generally, other small injections will have to be added as the FRT is constructed.

The FRT has several possible outcomes:

- The original injection is connected to the desirable effects, demonstrating logically that it will do what we hoped and no new undesirable effects will arise. This is the desired outcome.

- The original injection cannot be connected to the desired effects through a chain of cause-and-effect reasoning, indicating that it is not as powerful a solution as we had hoped. In this case, we would go back to the EC to identify other more powerful injections.

- The original injection is connected to the desirable effects, demonstrating logically that it will do what we hoped, but new UDEs arise. Referred to as "negative branch reservations," these effects must be trimmed before the injection is implemented, if they are serious enough. In many cases, an action or injection that will trim the negative branch (prevent the new UDE from occurring) can be identified as the FRT is constructed and added to it. For more serious problems, an EC may have to be constructed to develop an injection to trim the negative branch.

In the FRT for the PE case shown in Figure 4, injections are in square-cornered boxes, desirable effects are shown in gray boxes, and other entities necessary to complete the cause-and-effect logic are in rounded-corner boxes. Although Figure 4 represents the final FRT, it should be clear from the above discussion that constructing it is an iterative process. From the FRT, we can see that the injection (such as 401, "PE contracts with a recruiting agency") naturally flows through cause-and-effect logic to the desirable effects (such as 415, "Employee satisfaction increases") at the top of the tree. As we had hoped, our injection leads to both customer and employee satisfaction, conditions opposite the undesirable effects at the top of the CRT.

When PE made the major strategic decision near the end of its existence to acquire Frontier Airlines, Burr thought the acquisition would solve several problems—access to the business travel market that generated higher fares, geographic expansion to the western US, and a substantial increase in size—allowing it to become big enough to survive in an increasingly competitive, unregulated market. Had Burr done an FRT for the purchase of Frontier, he might have seen that the acquisition, in fact, *created* significant problems: different cultures, disparate pay scales, and contracts that PE management was unable to solve and that led almost directly to the company's downfall.

Upon completion of our FRT, we have a list of injections that constitute a new strategy for the firm. If they are all

actions we can take right now, then the thinking process can stop at this point. Generally, however, there are obstacles that prevent us from taking at least some of the necessary actions. When this is the case, the next tool is used: the prerequisite tree.

Strategy implementation ➜ the prerequisite tree (PrT)

The purpose of a *prerequisite tree* is to identify all obstacles to the implementation of a desired course of action. We construct it by first developing a list of the obstacles that stand in the way of immediately implementing the injections reflected on the FRT. For each obstacle, an intermediate objective, representing either an action or a condition that overcomes the obstacle, is determined. The list of obstacles (hexagons) and intermediate objectives (rectangles) is then put in order of precedence—the first objective to overcome at the bottom of the tree, followed by the second, and so on. Next to each intermediate objective is the obstacle it overcomes. Thus, the PrT flows from the present at the bottom to the future at the top, where the final objective (in the gray box) is reached. However, the most straightforward way to read the PrT is from top to bottom, using language similar to that of the EC. Starting at the top, the PrT would be read: "In order to have (the objective), we must have (next lower intermediate objective) in order to overcome (obstacle)."

In this vein, the People Express PrT (shown in **Figure 5**), reads: "In order for PE to contract with a recruiting agency to do the hiring (515), PE must sign a contract with an agency (512) to overcome the fact that it has not yet contracted with one (511)." We continue building the PrT sequentially by identifying other obstacles and intermediate objectives until we reach an objective that can be implemented now. In this example, we reach the intermediate objective "PE gets management buy-in to hire a recruiting agency (500)."

Strategy implementation ➜ the transition tree (TrT)

In some cases, the sequenced list of intermediate objectives represented by the PrT provides enough detail for implementation. However, if the obstacles are significant and the intermediate objectives represent complex actions, a more detailed plan may be needed. For this we turn to the *transition tree.* The logic used in the TrT is the same as for the CRT and FRT. Moreover, it is also similar to the FRT in that both are concerned with future actions and consequences. However, it is much more detailed and usually follows a repeating structure. The greater level of detail is required by the nature of the TrT as a detailed implementation tool, in contrast to the purpose of the FRT, which is to test the broad consequences of a proposed course of action.

Figure 5
The People Express prerequisite tree (PRT)
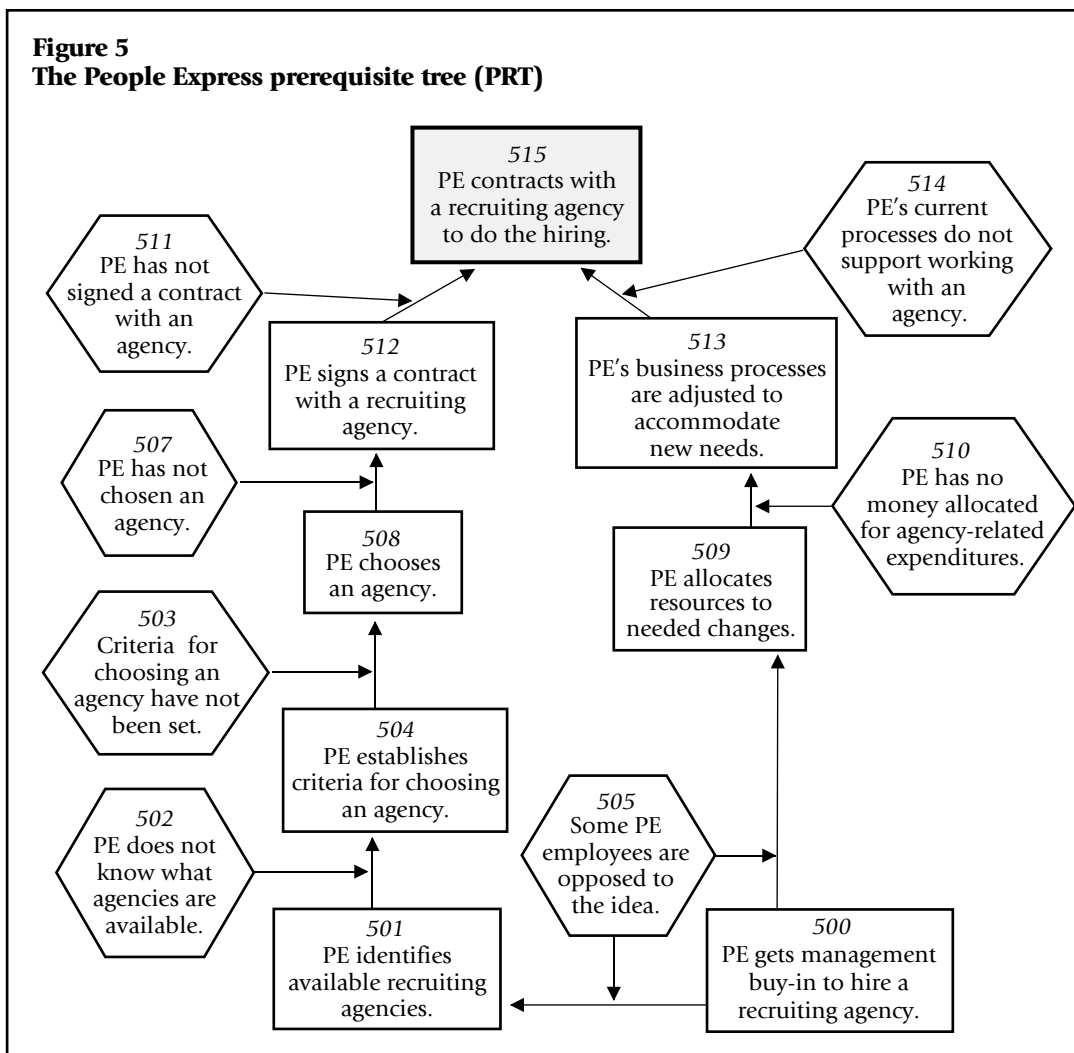
The People Express TrT, illustrated in **Figure 6** on the next page, shows the repeating five-element structure. Entities 601–605, 606–610, and 611–615 are all examples of this structure. The lower three entities (such as 611, 612, and 613) represent a specific action, an unmet need, and a condition of reality, respectively. The two entities on top (such as 614 and 615) represent an expected effect of the action and the logic of the sequence, or the rationale for the next-level need.

Implications for strategic planning

The current reality tree and the evaporating cloud are ideal tools for allowing a management group to develop the common mental models or collective intuition critical to success in strategy development and implementation. The CRT allows all decision makers to examine and challenge the cause-and-effect relationships presented in the snapshot of the firm's current reality. Even more effective is the group creation of the tree, allowing all relationships to be discussed in the process and generating buy-in for the process and the result. The EC requires specific consideration of assumptions, bringing them to the surface and allowing—in fact, requiring—discussion. The future reality tree ensures that proposed solutions are not just pie-in-the-sky and will not cause more problems than they solve. In other words, it helps avoid half-baked solutions. The prerequisite and transition trees create the bridge that is missing in most approaches to strategic planning—that between the plan and its implementation.

We have two perspectives to offer on the thinking processes. The first is *strategic planning as sense-making*, introduced earlier in the story about the Hungarian soldiers lost in the Alps. Because strategy development is a creative process, there is no one best "solution" or strategy that will result from the thinking processes. However, the plan that results will have a number of features that bene-

fit the firm. Weick concluded from his example of the Hungarian troops that although accuracy in a map is nice, it is not necessary for sense-making; what is necessary, he says, is "something that preserves plausibility and cohere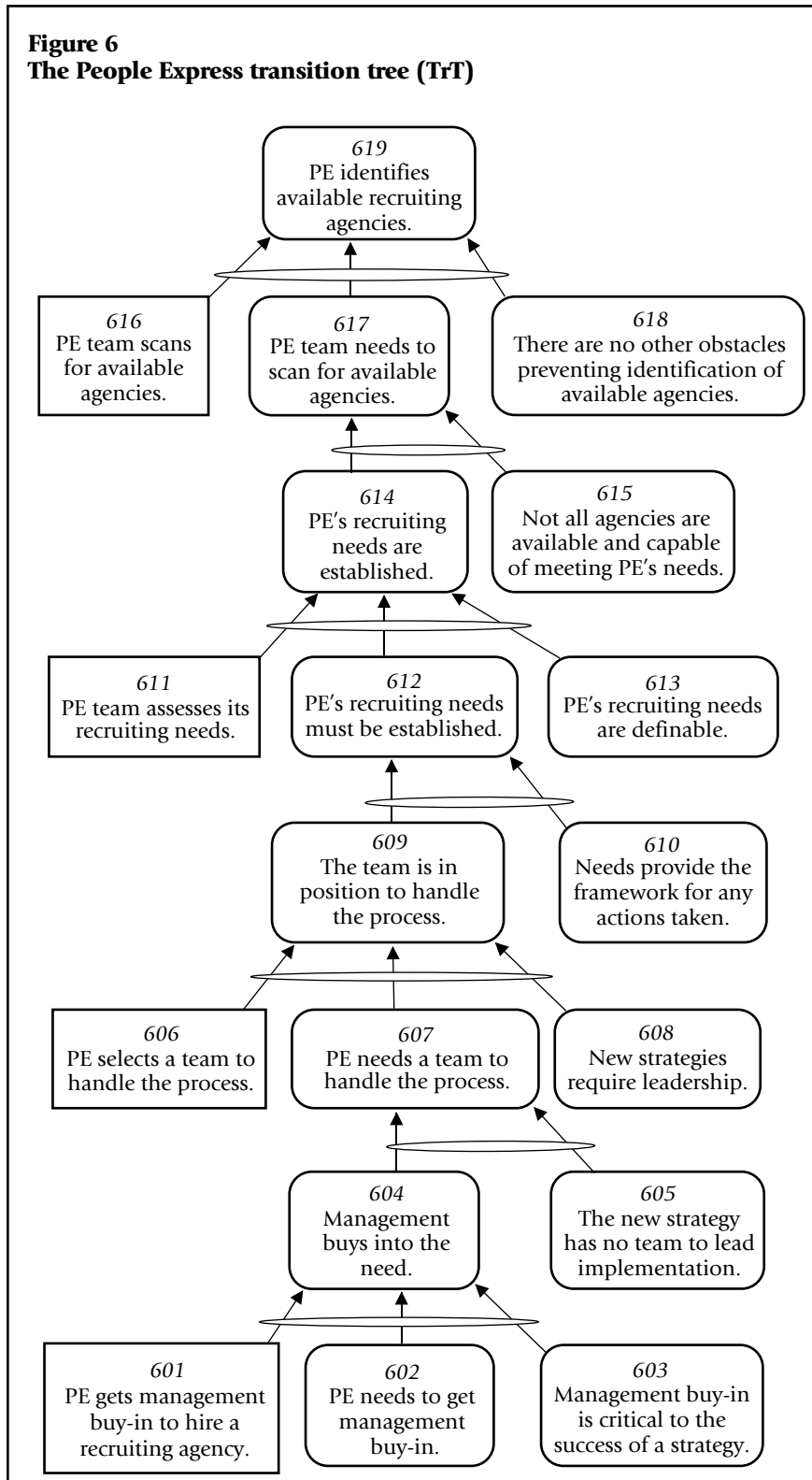nce, something that is reasonable and memorable, something that embodies past experience and expectations, something that resonates with other people, something that can be constructed retrospectively but also can be used prospectively, something that captures both feel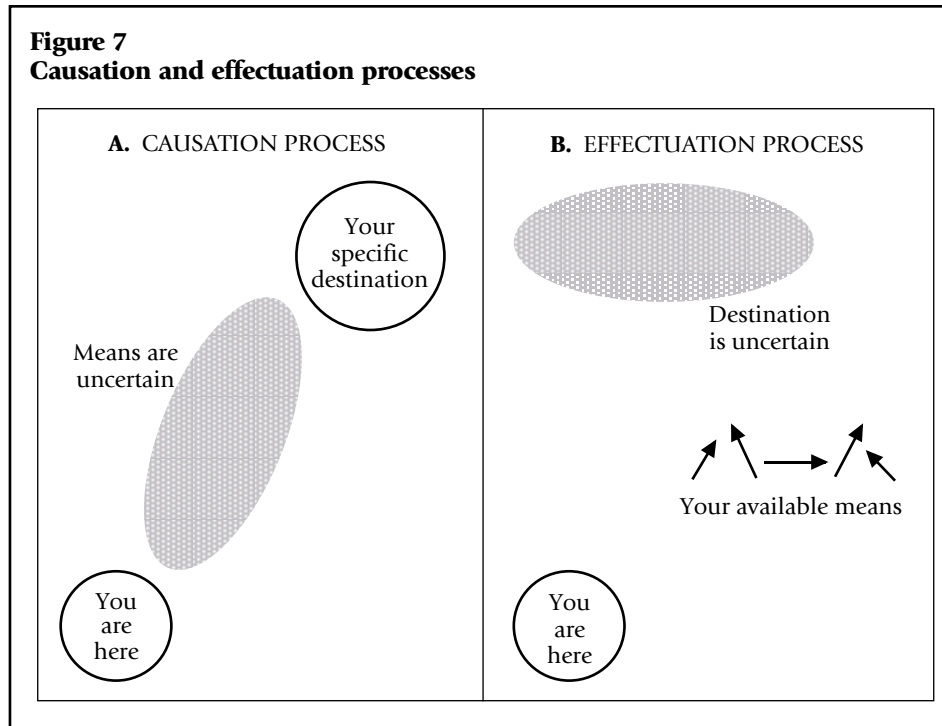ing and thought, something that allows for embellishment to fit current oddities, something that is fun to construct. In short, what is necessary in sense-making is a good story."

As Weick notes, stories both explain and energize. But not everybody is a good storyteller. The approach in this article performs the same function as a good story but is more structured. If done properly, everyone who participates in the creation of the thinking process trees and evaporating cloud understands and buys in to the results—critical if the management team is to have a chance of moving the company in a consistent direction.

The second perspective we offer is that of the thinking processes as *methods of effectuation.* As Sarasvathy (2001) explains, a causation process takes a particular effect (strategic destination) as given and then decides between means that will result in that effect. An effectuation process, on the other hand, has a range of possible effects or outcomes and starts with a given set of means, a set of constraints on effects imposed by both the means and the environment, and some criteria for selecting between possible effects. Sarasvathy uses the example of the difference between throwing a dinner party and making dinner on a typical night. Planning a party is a causation process; we develop a specific menu (strategic destination), then procure the means (ingredients, servers, and so on) to bring it about. Preparing dinner many nights is an effectuation process; we look through the cupboards and refrigerator to see what we have on hand. In the former process, the destination is specific, although we do not necessarily have the means readily available to bring it about. In the latter process, the destination is uncertain, though we are aware of our means. **Figure 7** illustrates this difference. Of course, as Sarasvathy points out, these are extremes. Even in a causation process we would generally not completely ignore our means when deciding on a destination; and in an effectuation

Figure 6
The People Express transition tree (TrT)

Figure 7
Causation and effectuation processes

A. CAUSATION PROCESS

Your specific destination

Means are uncertain

You are here

B. EFFECTUATION PROCESS

Destination is uncertain

Your available means

You are here

process we would have at least a general idea of where we want to end up before starting out.

Although the TOC thinking processes can be used in either causation or effectuation processes, they lend themselves very readily to effectuation because they take current means and constraints into account in deciding on a course of action. A specific final destination may not be clear, but the thinking processes provide a feasible path to a general destination: improved profits. Along the way, a number of different factors (resource, policy, procedure) may constrain the firm, things that might traditionally be considered either tactical or strategic. The TOC does not distinguish between these decision levels; it addresses whatever the limiting factor is at each point in time. In our discussion of the People Express case, the human resource issue that happened to be the company's core problem at a critical point in its history was not strategic in the normal sense, but it had a big impact on the company's outcome.

Raimond (1998) and other practitioners and academicians have recently challenged the universal appeal of traditional strategic planning concepts. They all agree that the discipline of strategy is at the point at which a new model—a new way of making sense of what strategy is and how it works—should be explored. We hope that this necessarily brief description of the TOC thinking processes provides a glimpse of how tools can be used in situations other than strategic planning. We also

hope we have been able to show how use of these processes is a radically different approach to strategy formulation. Specifically, the tools presented here address one of the key problems inherent in strategic planning: the black box of formulation. The People Express case offers an example of a structured approach to using management's intuition to develop strategy.

Strategy formulation is, by necessity, a creative act. Rather than simply stressing the importance of intuition and insight, however, the TOC tools provide a structured way to use intuition to develop creative solutions. The thinking processes are a way to develop creative strategies that are specific to a company's situation, to achieve buy-in by key decision makers, and to link strategic plans tightly to implementation tasks. ❍

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