A Dynamic Model of Organizational Decision Making: Chemco Revisited Six Years After Bhopal

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This paper provides an interesting longitudinal case for studying how decision reference points and constraints change over time in response to the occurrence of a low-probability, high-consequence event.

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Abstract
The authors develop a dynamic model of organization decision making that is motivated by the decision-making process at a multinational chemical firm, given the pseudonym Chemco, that they visited shortly after the Union Carbide explosion in Bhopal, India, and again six years later. Two major decisions were taken by Chemco that could be attributed in large part to the Bhopal disaster: the divestiture of one of its plants and the sale of a business. An analysis of those actions by Chemco underscores the importance of reference points and constraints in influencing organizational choices.

(Organizational Change; Decision Making; Catastrophes)

The Union Carbide disaster, in Bhopal, India, on December 4, 1984, clearly raised the public’s concern about chemical safety to new levels. A similar heightening of concern about severe accidents at nuclear power plants followed the Three Mile Island incident in Pennsylvania in 1979 and the Chernobyl nuclear power plant accident in the Soviet Union on April 26, 1986.

What is not so clear is whether the accident in Bhopal caused major long-term changes in the management of chemical companies because of specific concerns about health and safety issues. We examine the impact of the Bhopal event on two major decisions that a multinational chemical firm in the Fortune 500 (here given the pseudonym “Chemco”) made six years later. Specifically, we show that the explosion at the Union Carbide plant in India was instrumental in Chemco’s divestiture of one of its plants and its sale of a business.

Other factors besides health and safety risks played a role in these two important actions, but our discussions with Chemco executives strongly suggest that they would not have been taken as quickly or perhaps at all without the occurrence of the accident at Bhopal. Our findings motivate us to develop a dynamic model of organizational decision making that highlights the importance of changes in reference points and constraints on new decisions undertaken by firms.

First, as background we summarize the findings from a set of interviews with Chemco executives that we undertook immediately after the Bhopal accident. We then introduce the importance of reference points and constraints in influencing organizational change and use these concepts to develop a dynamic model of choice to characterize a firm’s activities following a catastrophic accident. The model is used to examine two major decisions made by Chemco after 1987. On the basis of our analysis of those two case examples, we present three broad insights about organizational behavior with respect to health and safety issues. In conclusion, we note issues for future research.

Study Background
Just prior to the Bhopal accident, we were conducting interviews with executives at Chemco on how they were
coping with their environmental problems, especially hazardous waste. We then undertook 20-hour-long discussions with Chemco executives on how the company was and would be reacting to the accident.

Those interviews, completed during the year immediately after the Bhopal accident, were designed to determine how corporate behavior was influenced by a low probability/high consequence (LP/HC) event. Rather than using a structured protocol, we let each person tell his own story by raising a set of broad questions about how "Bhopal affected you personally, your group, the organization, and society." On the basis of these interactions we concluded that the disaster led to significant changes in the operations of the plants that were likely to have long-term effects.

Within two days after the disaster, Chemco telephoned a questionnaire to all plant managers around the world to determine which chemicals had the potential of causing an accident and how serious the impacts might be should such an event occur. The company sent inspection teams to plants that housed any of those chemicals. It then developed a set of recommendations for reducing the chances of a future catastrophic accident that could seriously harm residents in the surrounding communities.

The Bhopal event had an important impact on the decision processes of Chemco. Prior to the disaster the firm had used standard risk assessment procedures, such as fault trees and event trees, to design production processes and meet specific standards. Afterward the focus was on worse-case scenarios affecting the public, the intent being to reduce the chances of such events to as close to zero as practicable. Because the Bhopal event was sudden and unexpected, the company directed its attention to acute toxic and explosive events with little concern for chemicals that could cause chronic illnesses (Bowman and Kunreuther 1988).

Chemco’s actions after Bhopal followed a pattern that is typical of corporate behavior in response to LP/HC events. Prior to an accident, the firm focuses on a probability threshold \( p^* \) and assumes that any event whose estimated probability \( p \) is less than \( p^* \) will effectively have a zero chance of occurrence. Hence, no consideration is given to ways of reducing the risk of such events. After a catastrophic accident in its own plant or in the industry, the firm emphasizes ways of avoiding such events in the future even if \( p < p^* \) (Mitroff and Kilmann 1984, Camerer and Kunreuther 1989).

On the basis of a detailed analysis of each plant that housed chemicals capable of causing a catastrophic accident, Chemco’s managers took the following steps within a year after Bhopal:

1. They instituted new chemical monitoring and control procedures designed to make the surrounding communities safer.
2. They reduced the inventory of toxic chemicals to lower the risk of a potentially catastrophic accident. For most of the chemicals this action was not costly, and in some cases actually produced net benefits, over their current activity.
3. They developed plant and community disaster evacuation plans to prepare for a similar type accident in Chemco’s operations.
4. They developed a set of general principles for safety operation designed to avoid a future worst-case scenario similar to the Bhopal accident.

Factors Influencing Organizational Change

This section considers how a catastrophic event, such as the Bhopal disaster, influences the organizational decision-making process through a change in reference points, and how the emergence of constraints affects the actions firms will take.

Reference Points

Reference points are specific values or states of the world used to judge alternative proposals. Recent studies of managerial decision making suggest that several different reference points may guide the managerial choice process. For example, March and Shapira (1992) suggest that organizations focus on one of two reference points in making their choices, an aspiration level for resources that adapts to experience or a fixed survival point at which resources are exhausted. The authors postulate that the reference point used will depend on managers’ attitude toward risk and their decision rules. A reference point, which is closely related to the concept of a survival point, is a worst-case scenario. It is often used by decision makers in the firm as the basis for evaluating the risk associated with specific activities.

Kahneman (1992) suggests that individuals often make decisions by using multiple reference points and supports that notion with concepts from norm theory. Managers are postulated to be influenced by several different attributes, each of which may have a discrete reference point, but may still be guided in their choice by the organizational reference point, such as the survival point. To date no experimental work has examined the managerial behavior process from both an individual and an organizational perspective.
Changes in Reference Points
A common reference point used by individuals in their choice processes is the status quo. A proposed course of action is evaluated relative to maintaining the status quo. One reason for not moving away from the status quo is loss aversion. As Tversky and Kahneman (1991) have shown, the disadvantages of departure from the status quo (i.e., losses) are weighted more heavily than the advantages (i.e., gains), leading to a tendency to maintain the current position.

A growing literature in organizational theory supports the tendency of firms to use the status quo as a reference point and resist change. (Cyert and March 1963, van de Ven 1986). Miller and Friesen (1980) contend that:

The one theme that stands out in the literature is that organizations tend to demonstrate great sluggishness in adapting to their environments. Organizations often resist change even when their environments threaten them with extinction (p. 591).

A catastrophic accident such as the Bhopal explosion may play a critical role in an organization’s planning by changing how it views the status quo. In particular, the firm may focus on a worst-case scenario as a reference point, whereas prior to the accident it paid relatively little attention to such a possibility.

The role of some type of event or crisis in triggering change in an organization’s behavior by affecting reference points is highlighted by Marcus and Weber (1989). They stress the importance of jolts, either external or internal to the firm, to stimulate innovations within the organization. Often a firm’s managers feel some action may be needed, but do not actually take it until some crisis occurs that makes the situation unacceptable.

Istvan (1992) gives an example of impetus for change caused by increasing costs. Firms whose special orders for equipment (heavy trucks) escalated in relation to standardized orders found that processing time increased enormously. Only when the production schedule became unmanageable did the company take special action and reduce the number of special orders in relation to standard orders. By lowering the percentage of special orders to less than half of total orders, the firm was able to reduce the processing time to its normal level.

New government health and safety regulations may also change the firm’s reference point with respect to the risks it feels it can tolerate, leading to changes in production processes and the level of inventory of raw materials and/or finished goods. In such cases, the reference point or the change in reference point comes from outside the firm from sources such as the government or the industry. An industry trade association could play such a role. In other cases it comes from occasions or debate inside the firm.

The changing perception of the environment and an organization’s response to it are well captured in the numerous field studies undertaken by Mintzberg (1978). He argues that patterns of strategic change are never steady, but rather irregular and ad hoc. Organizations go through periods of stability followed by periods of change. A similar process is posited by Tushman and Romanelli (1985), who characterize organizational activity as punctuated equilibrium. That is, neither stability nor change is an abnormal state; rather, they alternate with each other, sometimes triggered internally and sometimes externally.

Levitt and March (1988), in their comprehensive survey of organizational learning, point out the difficulties firms face in making changes over time. Some of those challenges involve well-known biases in behavioral decision making such as competency traps, the availability heuristic, the ambiguity of success, superstitious learning, and the paucity, redundancy, and complexity of experience.

Importance of Constraints
Constraints are likely to have a strong impact on managerial decision making in an organization. They represent limitations or restrictions on the actions a firm can take. For example, capital shortages are a constraint to a firm that is interested in purchasing or building a new facility.

The emergence of new constraints or changes in old ones can be due to organizational shifts within the firm, such as the appointment of a new manager with views different from those of his or her predecessor. They also may be triggered by external events, such as new congressional legislation, decreased demand for a product, or increased costs of capital.

Simons (1991) emphasizes the importance of constraints on strategic decisions by firms using management control systems. In a study of 30 businesses in the U.S. health care industry, he shows how profit planning systems and budgeting systems provided both threats and opportunities for managers. The firms were likely to make strategic changes because of changes in the rules of the game due to government legislation and new regulations.

In the context of health, safety and environmental risk, regulatory constraints, such as standards set by the Occupational Health and Safety Administration (OSHA) and the Environmental Protection Agency
(EPA) for maximum emission of asbestos fibers in the air, can influence a firm's production processes. Recently, the Clean Air Act Amendments (Section 112r) required firms to develop risk management plans for presenting communities with worst-case scenarios associated with chemical accidental releases. The new ruling imposed a set of constraints on firms' behavior and may require firms to adopt protective measures they had not previously anticipated (Er et al. 1995).

A Dynamic Model of Organizational Decision Making

Changing reference points and the emergence of constraints combined with some concepts of the garbage can model of choice developed by Cohen et al. (1972) provide the basis for a framework for understanding organizational decision making over time. The relationships, depicted in Figure 1, characterize a dynamic model of organizational behavior when an external event, such as the Bhopal disaster, has a strong impact on a firm.

Functional Relationships

We use functional relationships of the form \( A = f(B, C) \) to characterize a particular situation, meaning that a change in variables \( B \) and/or \( C \) will have an impact on variable \( A \). The magnitude of the impact and its significance to organizational decision making are issues for more detailed empirical study. After formulating those relationships, we provide illustrative examples of how they affected the decision-making process at Chemco.

\[ \text{Change in Reference Points} = f \text{ (New Occasions)} \]

New occasions, such as a major accident, new regulations, or the status of the economy, will change the reference points on which decisions are based. A worst-case scenario may become a new reference point, whereas prior to the disaster it was not even considered as part of the decision-making process.

Chemco examined the chemicals in each of its plants that had catastrophic potential to determine the possible impact on the population within one mile of the plant. On the basis of an empirical formula, a specified numerical value was chosen arbitrarily as a cut off for determining whether a chemical should be examined further by the study team. Such an analysis had never been done prior to Bhopal (Bowman and Kunreuther 1988, p. 391).

\[ \text{Change in Constraints} = f \text{ (New Participants, New Occasions)} \]

A change in the participants in the decision-making process may cause the firm to introduce new constraints or relax current ones. New participants might be residents living near the plant who are concerned about the possibility of a large chemical accident in their area, given that one occurred elsewhere. They may encourage their legislative representatives to enact more stringent regulations for the avoidance of worst-case scenarios, as illustrated by Section 112r of the Clean Air Act Amendments. Consequently, the firm may take certain actions such as reducing its inventory of potentially toxic chemicals.

\[ \text{New Problems} = f \text{ (Reference Point Changes, Constraint Changes)} \]

If the reference point changes (e.g., the focus shifts to avoiding worst-case scenarios) or new constraints arise (e.g., safety concerns of residents near the plant), the firm is faced with new problems. An example of a new problem is how to minimize the chance that accidents
like the one at Bhopal will occur in one of the company’s plants.

\[ \text{New Solutions} = f(\text{New Problems}). \]

If new problems arise due to reference point changes, new solutions must be found. If the firm is concerned about avoiding a Bhopal-like disaster in the future, it may reexamine some of its operations that pose a threat of a catastrophic accident.

**Applying the Framework to Chemco’s Problems**

We returned to Chemco during 1990 and 1991 six years after the Bhopal event, and interviewed 10 executives, both line and staff, each of whom had some responsibility and concern for health, safety, and the environment. Our interest was in determining what major changes (if any) had occurred in the firm since the Bhopal accident. Our dynamic model of choice was constructed subsequent to the discussions with the executives. In other words, we developed the model from the stories we heard rather than having it as a frame of reference for conducting the interviews.

Each individual was asked to comment on whether he or she perceived any major changes to have occurred in Chemco after the Bhopal disaster and if so what rationale was used to justify those changes. A specific question was raised as to the role (if any) the Bhopal accident played in those new developments. There was general agreement that Chemco had taken two major actions after the accident, selling a Japanese plant and selling its surfactant business. Seven of the ten executives specifically mentioned each of those decisions as important ones taken by the company.

We examine each problem and solution by showing how the model characterizes the decision process of the firm. Appropriate quotes from participants highlight certain elements of the model. The prescribed actions taken by Chemco were “surprises” to the executives we interviewed as well as to us. More specifically, in our first set of interviews at Chemco, no one had predicted that those changes would occur. New concerns about health risks from chemicals affecting people residing near Chemco plants appear to have triggered the problems and the proposed solutions.

In considering the two decisions, viewing the decision process as having three phases is useful. Phase 1 is risk assessment prior to the Bhopal event, phase 2 is assessment immediately after the event, and phase 3 is assessment six years later. Chemco changed its risk assessment immediately after the Bhopal accident, but what impact that event would have on the decision-making process several years later, was unclear at the time.

**Decision 1: Selling a Plant in a Major Japanese City**

Since the early 1970s Chemco had operated a plant in Tokyo. Unlike most of the company’s other plants, it was owned jointly with Japanese partners. Prior to the Bhopal accident, Chemco had some concerns about the plant’s profitability but was not worried about health and safety risks to either its employees or the surrounding population (phase 1). The plant had been constructed in a relatively isolated location; however, over the next 20 years many apartments and dwellings were erected adjacent to the plant because workers preferred to live close to their place of employment.

**Change in Reference Point.** All Chemco employees we interviewed who were familiar with the Japanese plant felt the Bhopal accident was an occasion for change because it forced the firm to focus on the possible accidental release of one of its chemicals, chloromethyl ether (CME). Should an explosion result from a release, the CME could adversely affect the health of residents in the surrounding community. As early as 1985 the plant was viewed as a potential hazard (phase 2).

The change in reference point, from viewing the probability of an accident as so small that it was not worth worrying about to focusing on the consequences of a disaster, was stimulated by both the Bhopal event and the change in the composition of the area surrounding the plant. The new perspective is illustrated by the following quotes from our interviews.

The plant never did pass muster from the first Bhopal study identifying the 10 risks in the company. It was in the middle of a crowded area and the days are past when you can do this . . . . People don’t like an industrial facility in the middle of the city.

The concern about catastrophic potential was larger in Tokyo than [what occurred in] Bhopal given the larger number of people affected by the Japanese plant.

**Relaxation of Constraints.** After the Bhopal disaster, a change was made in the organizational structure at Chemco with the appointment of a new chairman and a new president. They were not committed to the Japanese plant in the same way their predecessors had been. In other words, the top managers had no vested interest in the decision to operate a plant in Japan. Executives in the firm could explicitly address the question of whether the plant was sufficiently prof-
itable for Chemco to maintain its current arrangement with the Japanese.

The combination of a new team at Chemco and concerns about whether the plant would pull its weight economically in the future led the firm to divest the plant. The process took longer than Chemco envisioned because of the reluctance of the Japanese to abandon the status quo. The following comment by a Chemco executive highlights this point.

Things don’t go that fast in Japan. The Japanese usually don’t sell anything. They find a real estate developer and say I don’t like this location very much. What should I do about it?

New Problems and Solutions. The perception of the risk from CME stimulated by the Bhopal accident combined with the economic considerations led Chemco to close the plant in 1990. It was willing to take that action and sell the site for more than $100 million because it could still supply CME through a French plant that it operated. At the same time, it decided to build a new plant in Japan for other product lines in a much less populated area of the country (phase 3).

The use of a worst-case scenario as a new reference point, coupled with top managers’ concern about profitability, raised the question of how Chemco could extricate itself as quickly as possible from owning the plant. The firm’s behavior suggests that the Bhopal event was only one factor in a much more complicated decision process involving risk and profitability. That point is summarized by the following comment of a Chemco executive.

Yes, Tokyo was one of the top priority discoveries for problems based on the early post-Bhopal study. But you have two different teams involved, and executives were changing. Bhopal accelerated the Tokyo shutdown. There would have been a plan to get out of there ultimately.

Decision 2: Selling the Surfactant Business

For many years Chemco operated a plant that used ethylene oxide (EO) to produce surfactant. Although it was a profitable operation, the plant was not central to the company’s main production processes. Chemco always knew that EO was potentially explosive, but prior to the Bhopal accident saw negligible risk in shipping the chemical to the plant from a supplier approximately 15 miles away. In fact, in 1980 regular freight trains shipped the chemical by a circuitous route through a series of railroad transfer yards requiring a six-day travel time (phase 1).

The firm was also convinced that they had adopted sufficient protective measures to ensure that employ-

ees were not subject to any significant risks from transporting the chemical. In fact, an executive at Chemco felt there was less chance of a serious accident “than a person being hit by lightning.” Economic considerations, such as decreased profitability of the business, and an attractive option to sell the plant, led Chemco to divest itself of the surfactant business in 1990. This enabled it to deal with capital constraints that had affected the company for several years prior to 1990. New leadership in the firm after Bhopal also made it easier to change from the status quo.

Change in Reference Point. As with the Japanese plant, Bhopal called attention to the risk associated with certain chemicals in the surfactant business. When the company evaluated all its chemicals which were considered to have catastrophic potential, EO was at the top of the list (phase 2). Previously, that chemical had been viewed with much less concern. The chance of its causing an accident was considered extremely low by scientific experts in the firm. In fact, at the time of the Bhopal accident one of the executives interviewed said that “the company was not abandoning any of its businesses.”

The change in reference point to a focus on the worst-case scenario altered the picture dramatically, as illustrated by the following comments from our Chemco interviews:

We have dealt with EO for years without any major incidents.

Risk analysis [after Bhopal] convinced us that rail movement through the city presented the potential of a serious accident.

Ethylene oxide has more catastrophic potential than any other chemical.

Importance of Constraints. The catastrophic potential of EO was not the only factor that led Chemco to consider whether to continue operating the surfactant plant. Economic considerations were also important. Upgrading the plant through a possible joint venture with another American firm would have cost nearly $50 million. Outside funds would have been needed because the firm was facing a severe capital shortage. As one executive described the situation:

It had something to do with the capital constraint. Where can you raise capital as a CEO?

New Problems and Solutions. Even though no accident had occurred at Chemco during the 50 years it had used ethylene oxide, after the Bhopal accident the firm recognized the potential for a catastrophic event from that chemical. It therefore arranged for a special
“through” train with the railroad, which took only three hours to ship EO. The arrangement seemed satisfactory until a minor derailment occurred in a freight yard. It caused no major damage but if the freight car had contained EO and ruptured, it could have caused an enormous explosion. The event caused additional concerns about the potential risks associated with transporting EO by train. Other firms in the industry expressed similar reservations about shipping EO by train. In other words, the Bhopal accident coupled with evidence from non-EO mishaps and concerns of other companies in the same industry defined the nature of the risk facing Chemco (phase 3).

All of the individuals we interviewed felt risk was the principal element which created the surfactant problem and eventually led to the sale of the business. As one Chemco executive noted:

Transportation risk got us out of the surfactant business. The facilities were old and needed upgrading but the principal reason for getting out of the business was that we had to ship EO.

The industry is no longer shipping this [intermediate material] and the whole production process is taking place at one location.

After discussions with a possible partner were terminated, Chemco decided to announce publicly that the business was for sale. The firm that offered to purchase the business outright at a relatively high price believed it had a comparative advantage over others in the industry.

The final decision to sell the surfactant operation was triggered by economic considerations as well as perceived risks associated with transporting EO. One of the executives we interviewed provided the following perspective on Chemco’s decision:

Last year we decided to sell the business... The CEO wanted to know where can you raise capital? Another company sold a surfactant business and we were surprised at the price. Our eyebrows went up at the price they got. The business was not strategic to us—forward or backward integration. It required an extremely dangerous chemical and capital requirements stretched the debt to equity ratio to the limit. We sold to another company. They were in the business and they manufacture the raw material.

By selling the business Chemco was forced to lay off 300 employees. Many of them complained that the decision was irrational given that there had not been an accident in 50 years. Chemco, however, was focusing on worst-case scenarios rather than the low probability of an event, so its reference point in making the final decision was different from that of persons who were affected adversely by the action.

Implications for Organizational Behavior
The decision process associated with the two major decisions taken by Chemco six years after the Bhopal disaster gave us several insights as to the factors that influence the behavior of key interested parties in coping with risks to health and safety. The factors are (1) changing reference points, (2) learning from accidents and near misses, and (3) learning from others about oneself.

Changing Reference Points
The decisions by Chemco to sell the Japanese plant and the surfactant business provide strong evidence that both external and internal forces can create specific occasions for changes in reference points. The Bhopal disaster generated increased concern in the public, government, and the company about the potential health and safety risks from catastrophic accidents, and led Chemco to give more consideration to the consequences of such events. The focus on worst-case scenarios created new problems for the firm because of its more detailed evaluation of the risks associated with chemical processes. In particular, the reassessment forced the firm to reevaluate some of its operations.

At the same time, internal constraints in the form of capital shortages led the firm to reevaluate its current operations and investment structure. The lack of available funds made it difficult for Chemco to justify upgrading its surfactant plant at a substantial cost. The unprofitability of the Japanese operation had been a source of concern for many years and selling the plant provided funds for other uses. In addition, the new CEO viewed the Japanese plant with greater concern than his predecessor because he had no vested interest in its operation. The CEO’s behavior supports the observation by Levitt and March (1988) that new organizational leaders define previous outcomes more negatively than persons who preceded them.

The Bhopal event provided an opportunity to alleviate the capital shortage problem. One of the principles of the garbage can model of choice is that solutions are looking for problems. In that sense, Chemco was aware that it could solve its capital shortage by looking for problems whose solution would help relieve the constraint. The attention the firm gave to worst-case accidents enabled it to divest two problematic nonprof-
itable operations and at the same time receive an infusion of new funds. 10

Learning from Accidents and Near Misses
Firms often learn from accidents and change their decision process as a result of a specific event. Prior to the event they may be in a competency trap, using specific rules of thumb. They may apply a particular heuristic because they have not had any negative experiences over time, even though their procedure may not be the best approach for addressing a particular class of problems (Levitt and March 1988, p. 322).

Prior to the Bhopal accident, Chemco was comfortable using fault trees and event trees to assess the risks associated with catastrophic events. After the accident the company began to question whether that was an appropriate way of studying LP/HC events. It had difficulty obtaining data with which to evaluate the accuracy of the probabilities that are at the core of such risk estimation techniques. The company therefore decided to focus on the worst-case scenario, thus avoiding the need to estimate probabilities of events for which empirical data are very limited. By focusing on these scenarios, Chemco could explore actions for reducing the consequences of catastrophic accidents.

At a more general level, an organization can often benefit from its past history by considering near misses (e.g., planes that almost crashed) as object lessons and learning experiences. March et al. (1991), in an article with the thought-provoking title “Learning from Samples of One or Fewer,” provide examples of how organizations convert meager experience into interpretations from history. The net is often cast wide enough to include the experience of other firms. Events that are sufficiently similar to the hazard in question may provide insight to ways the firm can reduce risks in the future.

Alternatively, the organization might ignore the data and interpret past successes as evidence of its competence rather than carefully examining whether it was just fortunate that some adverse event did not happen. The case of the Challenger accident illustrates this point. Considerable evidence from previous flights indicated that the O-rings presented potential problems. NASA and Thiokol personnel ignored the evidence because no failure had occurred (Starbuck and Milliken 1988).

Chemco was able to learn from an incident that had minimal consequences but demonstrated the possibility of severe losses: that is, a near miss. When a tank car shipping raw materials to its surfactant plant became derailed in the freight transfer yard, executives became concerned about what might have happened had the car ruptured or exploded. Although the derailment was treated as an “incident” rather than an “accident,” it was an important data point in Chemco’s analysis of whether it should sell the surfactant business to a supplier that produced the raw material.

Learning from Others About Oneself
In an uncertain or ambiguous climate, firms frequently look to their competitors to provide guidance for their own behavior and to help determine their core competencies. Where there is substantial commonality in experience, such influence has been labeled mimetic institutional isomorphism by DiMaggio and Powell (1983). Levitt and March propose that it is a major mechanism for diffusion as a form of organization learning. They also point out that actions by organizations often stem from a logic of appropriateness and legitimacy rather than from a logic of consequentiality or intention (p. 1988, 320).

Chemco executives stated that one reason for selling the surfactant business was that current industry practice is to produce the raw materials and the finished goods at the same location. That approach obviates having to ship potentially dangerous material, even if the chance of a transportation accident is estimated to be extremely low. Chemco sold the business to a competitor that was using such an approach. The Bhopal event gave Chemco a legitimate reason to sell the plant, and the chemical industry’s unwritten rule to no longer ship the raw material defined the appropriateness of the action.

Conclusions
We believe the two selling decisions by Chemco are well characterized by our dynamic model of choice. The change in reference points triggered by new occasions, such as the Bhopal explosion, coupled with new participants and new constraints enabled the firm to reevaluate its operations and finally make decisions that had been considered for a long time. The fact that Chemco did not take the actions immediately after the Bhopal event, but waited until five or six years, appears to be the reason they were “surprises” to us and to persons we interviewed.

One question raised by our field study is whether there are other ways for organizations to take steps that they know are likely to benefit them without having to rely on unanticipated events or crises to jolt managers into action. Would there have been an easy way to justify selling the surfactant business or the
Japan plant had the Bhopal accident not occurred? Our Chemco interviews suggest that those actions would eventually have taken place, but the Bhopal event accelerated them.

One potentially fruitful issue for future study is how organizations can learn from their own past behavior about ways to improve their future decision process. The dynamic model of choice presented here suggests that if managers systematically focus on past internal actions, in much the same way they look at external events such as the Bhopal disaster, they will learn how to make better decisions.

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Endnotes
1For a more detailed summary of the method and findings, see Bowman and Kunreuther (1988).
2Kahneman also suggests the possibility of an unstable situation in which the individual alternates between two reference points. Alternatively, the person could focus on a weighted average of the two points.
3This is analogous to the concept of incrementalism made famous by Lindblom (1959).
4See Samuelson and Zeckhauser (1988) for examples and experiments demonstrating a tendency to maintain the status quo even when there are good economic reasons for moving away from it.
5Organizational procedures for responding to uncertain events are usually based on past experience. Hence, a firm may not be prepared for potential technological disasters because such events are too infrequent for it to collect appreciable knowledge about them or to determine how to either mitigate their effects and/or respond to them (Clarke and Short 1993).
6Seven of these executives had been interviewed by us immediately after the Bhopal disaster, although five had changed position in the interim. The three executives with whom we had not spoken previously were all employed by the company at the time of the Bhopal accident; two had changed jobs in the interim.
7A third major decision taken by Chemco during this period was to not build a previously planned incinerator. The impetus for that action was a change in EPA and industrial policy on how society should manage waste. It was related only indirectly to the Bhopal accident.
8Executives who did not mention a specific decision as being important were in positions within the organization where they were not directly involved in addressing that particular problem facing Chemco.
9Similar developments occurred in Bhopal, where large slums developed around industrial plants in the city. In 1984 two slum colonies were across the street from the Union Carbide plant, even though the area was not zoned for residential use (Shirvivas 1987).
10That behavior supports the observation by Eisenhardt and Zbaracki (1992) that a longer time perspective improves the fit of the garbage can model of choice because as the scope of a decision increases, the participants become more varied and the number of solutions becomes larger.

References


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