Managing Uncertainty

Planning as Learning

by Arie de Geus

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Author's note: *I use the collective expression "Shell" for convenience when referring to the companies of the Royal Dutch/Shell Group in general, or when no purpose is served by identifying the particular Shell company or companies.*

Some years ago, the planning group at Shell surveyed 30 companies that had been in business for more than 75 years. What impressed us most was their ability to live in harmony with the business environment, to switch from a survival mode when times were turbulent to a self-development mode when the pace of change was slow. And this pattern rang a familiar bell because Shell's history is similarly replete with switches from expansion to self-preservation and back again to growth.

Early in our history, for example, there was a burst of prosperity in the Far East and we dominated the market for kerosene in tins and "oil for the lamps of China." Survival became the keynote, however, when Rockefeller's Standard Oil snatched market share by cutting price. In fact, it was the survival instinct that led in 1907 to the joining of Royal Dutch Petroleum and the Shell Transport and Trading Company—separate businesses until then and competitors in the Far East. This, in turn, paved the way for Shell's expansion into the United States in 1911 with a new product, Sumatran gasoline—also a reaction to Standard Oil's activities.

Outcomes like these don't happen automatically. On the contrary, they depend on the ability of a company's senior managers to absorb what is going on in the business environment and to act on that information with appropriate business moves. In other words, they depend on learning. Or, more precisely, on institutional learning, which is the process whereby management teams change their shared mental models of their company, their markets, and their competitors. For this reason, we think of planning as learning and of corporate planning as institutional learning.

Institutional learning is much more difficult than individual learning. The high level of thinking among individual managers in most companies is admirable. And yet, the level of thinking that goes on in the management teams of most companies is considerably below the individual managers' capacities. In institutional learning situations, the learning level of the team is often the lowest common denominator, especially with teams that think of themselves as machines with mechanistic, specialized parts: the production manager looks at production, the distribution manager looks at distribution, the marketing manager looks at marketing.

Because high-level, effective, and continuous institutional learning and ensuing corporate change are the prerequisites for corporate success, we at Shell have asked ourselves two questions. How does a company learn and adapt? And, What is planning's role in corporate learning?

My answer to the first question, "how does a company learn and adapt," is that many do not or, at least, not very quickly. A full one-third of the *Fortune* "500" industrials listed in 1970 had vanished by 1983. And W. Stewart Howe has pointed out in his 1986 book *Corporate Strategy* that for every successful turnaround there are two ailing companies that fail to recover. Yet some companies obviously do learn and can adapt. In fact, our survey identified several that were still vigorous at 200, 300, and even 700 years of age. What made the difference? Why are some companies better able to adapt?

Sociologists and psychologists tell us it is pain that makes people and living systems change. And certainly corporations have their share of painful crises, the recent spate of takeovers and takeover threats conspicuously among them. But crisis management—pain management—is a dangerous way to manage for change.

Once in a crisis, everyone in the organization feels the pain. The need for change is clear. The problem is that you usually have little time and few options. The deeper into the crisis you are, the fewer options remain. Crisis management, by necessity, becomes autocratic management. The positive characteristic of a crisis is that the decisions are quick. The other side of that coin is that the implementation is rarely good; many companies fail to survive.

The challenge, therefore, is to recognize and react to environmental change before the pain of a crisis. Not surprisingly, this is what the long-lived companies in our study were so well able to do.

All these companies had a striking capacity to institutionalize change. They never stood still. Moreover, they seemed to recognize that they had internal strengths that could be developed as environmental conditions changed. Thus, Booker McConnell, founded in 1906 as a sugar company, developed shipping on the back of its primary resource. British American Tobacco recognized that marketing cigarettes was no different from marketing perfume. Mitsubishi, founded in 1870 as a marine and trading company, acquired coal mines to secure access to ships' bunkers, built shipyards to repair imported ships, and developed a bank from the exchange business it had begun to finance shippers.

Changes like these grow out of a company's knowledge of itself and its environment. All managers have such knowledge and they develop it further all the time, since every living person—and system—is continuously engaged in learning. In fact, the normal decision process in corporations is a learning process, because people change their own mental models and build up a joint model as they talk. The problem is that the speed of that process is slow—too slow for a world in which the ability to learn faster than competitors may be the only sustainable competitive advantage.

Some five years ago, we had a good example of the time it takes for a message to be heard. One way in which we in Shell trigger institutional learning is through scenarios.[1] A certain set of scenarios gave our planners a clear signal that the oil industry, which had always been highly integrated, was so no longer. That contradicted all our existing models. High integration means that you are more or less in control of all the facets of your industry, so you can start optimizing. Optimization was the driving managerial model in Shell. What these scenarios essentially were saying was that we had to look for other management methods.

The first reaction from the organization was at best polite. There were few questions and no discussion. Some managers reacted critically: the scenarios were "basic theory that everyone already knew"; they had "little relevance to the realities of today's business." The message had been listened to but it had not yet been heard.

After a hiatus of some three months, people began asking lots of questions; a discussion started. The intervening months had provided time for the message to settle and for management's mental models to develop a few new hooks. Absorption, phase one of the learning process, had taken place.

During the next nine months, we moved through the other phases of the learning process. Operating executives at Shell incorporated this new information into their mental models of the business. They drew conclusions from the revised models and tested them against experience. Then, finally, they acted on the basis of the altered model. Hearing, digestion, confirmation, action: each step took time, its own sweet time.

In my experience this time span is typical. It will likely take 12 to 18 months from the moment a signal is received until it is acted on. The issue is not whether a company will learn, therefore, but whether it will learn fast and early. The critical question becomes, "Can we accelerate institutional learning?"

I am more and more persuaded that the answer to this question is yes. But before explaining why, I want to emphasize an important point about learning and the planner's role. The only relevant learning in a company is the learning done by those people who have the power to act (at Shell, the operating company management teams). So the real purpose of effective planning is not to make plans but to change the microcosm, the mental models that these decision makers carry in their heads. And this is what we at Shell and others elsewhere try to do.

In this role as facilitator, catalyst, and accelerator of the corporate learning process, planners are apt to fall into several traps. One is that we sometimes start with a mental model that is unrecognizable to our audience. Another is that we take too many steps at once. The third, and most serious, is that too often we communicate our information by teaching. This is a natural trap to fall into because it's what we've been conditioned to all our lives. But teaching, as John Holt points out, is actually one of the least efficient ways to convey knowledge.[2] At best, 40% of what is taught is received; in most situations, it is only about 25%.

It was a shock to learn how inefficient teaching is. Yet some reflection on our own experience drove the point home. After all, we had spent nearly 15 man-years preparing a set of scenarios which we then transmitted in a condensed version in 2½ hours. Could we really have believed that our audience would understand all we were talking about?

Teaching has another disadvantage as well, especially in a business setting. Teachers must be given authority by their students based on the teachers' presumed superior understanding. When a planner presents the results of many man-years of looking at the environment to a management team, she is usually given the benefit of the doubt: the planner probably knows more about the environment than the management team she is talking to. But when the same planner walks into a boardroom to start teaching about the strategy of the company, her authority disappears. When you cannot be granted authority, you can no longer teach.

Fortified with this understanding of planning and its role, we looked for ways to accelerate institutional learning. Curiously enough, we learned in two cases that changing the rules, or suspending them, could be a spur to learning. Rules in a corporation are extremely important. Nobody likes them but everybody obeys them because they are recognized as the glue of the organization. And yet, we have all known extraordinary managers who got their organizations out of a rut by changing the rules. Intuitively they changed the organization and the way it looked at matters, and so, as a consequence, accelerated learning.

Several years ago one of our work groups introduced, out of the blue, a new rule into the corporate rain dance: "Thou shalt plan strategically in the first half of the calendar year." (We already had a so-called business planning cycle that dealt with capital budgets in the second half of the calendar year.)

The work group was wise enough not to be too specific about what it had in mind. Some operating companies called up and asked what was meant by "strategic planning." But the answer they got—that ideas were more important than numbers—was vague. Other companies just started to hold strategic planning meetings in the spring.

In the first year the results of this new game were scanty, mostly a rehash of the previous year's business plans. But in the second year the plans were fresher and each year the quality of thinking that went into strategic planning improved. So we asked ourselves whether, by having changed the rules of the game—because that's what the planning system is, one of the rules of the corporate game—we had accelerated institutional learning. And our answer was yes. We changed the rules and the corporation played by the new rules that evolved in the process.

A similar thing happened when we tried suspending the rules. In 1984 we had a scenario that talked about $15 a barrel of oil. (Bear in mind that in 1984 the price of a barrel of oil was $28 and $15 was the end of the world to oil people.) We thought it important that, as early in 1985 as possible, senior managers throughout Shell start learning about a world of $15 oil. But the response to this scenario was essentially, "If you want us to think about this world, first tell us when the price is going to fall, how far it will fall, and how long the drop will last."

A deadlock ensued which we broke by writing a case study with a preface that was really a license to play. "We don't know the future," it said. "But neither do you. And though none of us knows whether the price is going to fall, we can agree that it would be pretty serious if it did. So we have written a case showing one of many possible ways by which the price of oil could fall." We then described a case in which the price plummeted at the end of 1985 and concluded by saying: "And now it is April 1986 and you are staring at a price of $16 a barrel. Will you please meet and give your views on these three questions: What do you think your government will do? What do you think your competition will do? And what, if anything, will you do?"

Since at that point the price was still $28 and rising, the case was only a game. But that game started off serious work throughout Shell, not on answering the question "What will happen?" but rather exploring the question "What will we do if it happens?" The acceleration of the institutional learning process had been set in motion.

As it turned out, the price of oil was still $27 in early January of 1986. But on February 1 it was $17 and in April it was $10. The fact that Shell had already visited the world of $15 oil helped a great deal in that panicky spring of 1986.

By now, we knew we were on to something: games could significantly accelerate institutional learning. That's not so strange when you think of it. Some of the most difficult and complex tasks in our lives were learned by playing: cycling, tennis, playing an instrument. We did it, we experimented, we played. But how were we going to make it OK to play?

Few managers are able to say, "I don't mind a little mistake. Go ahead, experiment," especially with a crisis looming. We didn't feel we could go to executives who run some of the biggest companies in the world and say, "Come on, let's have a little game." And in any case, board meetings have agendas, are fixed to end at a certain time, and require certain action to be taken. Still, within these constraints, we have found ways to learn by playing.

One characteristic of play, as the Tavistock Institute in London has shown, is the presence of a transitional object. For the person playing, the transitional object is a representation of the real world. A child who is playing with a doll learns a great deal about the real world at a very fast pace.

Successful consultants let themselves be treated as transitional objects. The process begins when the consultant says something like this to a management team: "We know from experience that many good strategies are largely implicit. If you let us interview people at various levels in your organization, we'll see whether we can get your strategy out on paper. Then we'll come back and check whether we've understood it."

Some weeks later the consultant goes back to the team and says: "Well, we've looked at your strategy and we've played it through a number of likely possibilities, and here is what we think will be the outcome. Do you like it?" The management team will almost certainly say no. So the consultant will say: "All right, let's see how we can change it. Let's go back to your original model and see what was built in there that produced this result." This process is likely to go through a number of iterations, during which the team's original model will change considerably. Those changes constitute the learning that is taking place among the team's members.

Like consultants, computer models can be used to play back and forth management's view of its market, the environment, or the competition. The starting point, however, must be the mental model that the audience has at the moment. If a planner walks into the room with a model on his computer that he has made up himself, the chances are slim that his audience will recognize this particular microworld. If the target group is a management team, the starting model must be the sum of their individual models. How can this be done?

One way is to involve team members in the development of a new common model and leave their individual models implicit. Alternatively, one can bring the individual models out in the open through interviews and make them explicit. In both approaches, computers can serve as transitional objects in which to store the common models that get built.

To most planners, one all-important aspect of these microworlds is counterintuitive: the probability that they have little relation to the real world. God seems to have told model builders that a model should have predictive qualities and that therefore it should represent the real world. In building microworlds, however, this is totally irrelevant. What we want to capture are the models that exist in the minds of the audience. Almost certainly, these will not represent the real world. None of us has a model that actually captures the real world, because no complex reality can be represented analytically and a model is an analytical way of representing reality. Moreover, for the purpose of learning, it is not the reality that matters but the team's model of reality, which will change as members' understanding of their world improves.

But why go to all this trouble? Why not rely on the natural learning process that occurs whenever a management team meets? For us at Shell, there are three compelling reasons. First, although the models in the human mind are complex, most people can deal with only three or four variables at a time and do so through only one or two time iterations.

Look, for instance, at current discussions about the price of oil. Nine out of ten people draw on a price-elasticity model of the market: the price has come down, therefore demand will go up and supply will eventually fall. Ergo, they will conclude, at some time in the future the price of oil must rise. Now we all know that what goes up must come down. But our minds, in thinking through this complex model, work through too few iterations, and we stop at the point where the price goes up. If we computerize the model of the person who stops thinking at the moment the price rises, however, the model will almost certainly show the price falling after its rise. Yet this knowledge would be counterintuitive to the very person (or persons) who built the model.

The second reason for putting mental models into computers is that in working with dynamic models, people discover that in complex systems (like markets or companies) cause and effect are separated in time and place. To many people such insight is also counter-intuitive. Most of us, particularly if we are engaged in the process of planning, focus on the effect we want to create and then look for the most immediate cause to create that effect. The use of dynamic models helps us discover other trigger points, separated in time and place from the desired effect.

Lastly, by using computer models we learn what constitutes relevant information. For only when we start playing with these microworlds do we find out what information we really need to know.

When people play with models this way, they are actually creating a new language among themselves that expresses the knowledge they have acquired. And here we come to the most important aspect of institutional learning, whether it be achieved through teaching or through play as we have defined it: the institutional learning process is a process of language development. As the implicit knowledge of each learner becomes explicit, his or her mental model becomes a building block of the institutional model. How much and how fast this model changes will depend on the culture and structure of the organization.

Teams that have to cope with rigid procedures and information systems will learn more slowly than those with flexible, open communication channels. Autocratic institutions will learn faster or not at all—the ability of one or a few leaders being a risky institutional bet.

Human beings aren't the only ones whose learning ability is directly related to their ability to convey information. As a species, birds have great potential to learn, but there are important differences among them. Titmice, for example, move in flocks and mix freely, while robins live in well-defined parts of the garden and for the most part communicate antagonistically across the borders of their territories. Virtually all the titmice in the U.K. quickly learned how to pierce the seals of milk bottles left at doorsteps. But robins as a group will never learn to do this (though individual birds may) because their capacity for institutional learning is low; one bird's knowledge does not spread.[3] The same phenomenon occurs in management teams that work by mandate. The best learning takes place in teams that accept that the whole is larger than the sum of the parts, that there is a good that transcends the individual.

What about managers who find themselves in a robin culture? Clearly, their chances of accelerating institutional learning are reduced. Nevertheless, they can take a significant step toward opening up communication and thus the learning process by keeping one fact in mind: institutional learning begins with the calibration of existing mental models.

We are continuing to explore other ways to improve and speed up our institutional learning process. Our exploration into learning through play via a transitional object (a consultant or a computer) looks promising enough at this point to push on in that direction. And while we are navigating in poorly charted waters, we are not out there alone.[4]

Our exploration into this area is not a luxury. We understand that the only competitive advantage the company of the future will have is its managers' ability to learn faster than their competitors. So the companies that succeed will be those that continually nudge their managers towards revising their views of the world. The challenges for the planner are considerable. So are the rewards.

1. Pierre Wack wrote about our system in "Scenarios: Uncharted Waters Ahead," HBR September–October 1985, p. 72 and in "Scenarios: Shooting the Rapids," HBR November–December 1985, p. 139.

2. John Holt, *How Children Learn,* rev. ed. (New York: Delacorte, 1983) and John Holt, *How Children Fail,* rev. ed. (New York: Delacorte, 1982).

3. Jeff S. Wyles, Joseph G. Kunkel, and Allan C. Wilson, "Birds, Behavior and Anatomical Evolution," *Proceedings of the National Academy of Sciences, USA,* July 1983.

4. Through MIT's Program in Systems Thinking and the New Management Style, a group of senior executives are looking at this and other issues.

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