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Summary: Many innovative ideas fail to be translated into meaningful strategic actions because these ideas are often at odds with the mental models prevailing in an organization. These mental models that hinder the acceptance of new insights are deeply ingrained internal images that managers working in a given organization tend to internalize unconsciously and often fail to adjust even though they are no longer relevant in a rapidly changing business environment. Thus, there exists an imperative need to study the discipline of mental model management, which basically involves the conscious monitoring, testing and improvement of the internal images that can greatly influence the manner that an organization's managers perceive the business environment in which they operate.

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Experienced managers know that many of the best ideas never get put into practice. Brilliant strategies fail to get translated into action. Systemic insights never find their way into operating policies. A pilot experiment may prove to everyone's satisfaction that a new approach leads to better results, but widespread adoption of the approach never occurs.

I am increasingly convinced that this lack of implementation is not the result of poor management. Rather, the process of adoption fails because the new ideas are at such variance with mental models currently accepted by the organization. More specifically, new insights fail to get put into practice because they conflict with deeply held internal images of how the world works, images that limit us to familiar ways of thinking and acting. That is why the discipline of managing mental models--surfacing, testing, and improving our internal pictures of how the world works-- promises to be a major breakthrough for building learning organizations.

None of us can carry all the complex details of our world in our minds. What we keep in our heads are images, assumptions, and stories. "The Emperor's New Clothes" is a classic story, not about famous people, but about people bound by mental models. Theft image of the monarch's dignity kept them from seeing his naked figure as it was.

Mental models can be simple generalizations, such as "people are untrustworthy," or they can be complex theories. But what is most important to grasp is that mental models shape how we act. If we believe people are untrustworthy, we act differently from the way we would if we believed they were trustworthy.

Why do mental models so powerfully affect what we do? In part, this is because they affect what we see. Two people with different mental models can observe the same event and describe it differently because they've noticed different details.

The way mental models shape our perceptions is no less important in management. For decades, the Big Three of Detroit believed that people bought automobiles on the basis of styling, not for quality or reliability. Judging by the evidence they gathered, the auto makers were right. Surveys and buying habits consistently suggested that American consumers cared about styling much more than quality. These preferences gradually changed, however, as German and Japanese auto makers slowly educated American consumers to the benefits of both quality and style--and increased their share of the U.S. market from near zero in 1965 to 38 percent by 1986. According to management consultant Ian Mitroff, these beliefs about styling were part of a pervasive set of assumptions for success at General Motors:

* GM is in the business of making money, not cars.

* Cars are primarily status symbols; therefore, styling is more important than quality.

* The American car market is isolated from the rest of the world.

* Workers do not have an important impact on productivity or product quality.

* Everyone connected with the system has no need for more than a fragmented, compartmentalized understanding of the business.

As Mitroff pointed out, these principles had served the industry well for many years. But the auto industry treated these principles as "a magic formula for success for all time, when all it had found was a particular set of conditions... that were good for a limited time."

The problems with mental models lie not in whether they are right or wrong--by definition, all models are simplifications. The problems with mental models arise when the models are tacit--when they exist below the level of awareness. The Detroit auto makers didn't say, "We have a mental model that all people care about is styling." They said, "All people care about is styling." Because they remained unaware of their mental models, the models remained unexamined. Because they were unexamined, the models remained unchanged. As the world changed, a gap widened between Detroit's mental models and reality, leading to increasingly counterproductive actions.

As the Detroit auto makers demonstrated, entire industries can develop chronic misfits between mental models and reality. In some ways, close-knit industries are especially vulnerable because all the member companies look to each other for standards of best practice. Such outdated reinforcement of mental models occurred in many basic U.S. manufacturing industries, not just automobiles, throughout the 1960s and 1970s. Today, similar outdated mental models dominate many service industries, which still provide mediocre quality in the name of controlling costs.

Failure to appreciate mental models has undermined many efforts to foster systems thinking. In the late 1960s, a leading American industrial goods manufacturer--the largest in its industry--found itself losing market share. Hoping to analyze their situation, top executives sought help from an MIT team of "systems dynamics" specialists. Based on computer models, the team concluded that the firm's problems stemmed from the way its executives managed inventories and production. Because it cost so much to store its bulky, expensive products, production managers held inventories as low as possible and aggressively cut back production whenever orders turned down. The result was slow and unreliable delivery, even when production capacity was adequate. In fact, the team's computer simulations predicted that deliveries would lag further during business downturns than during booms--a prediction that ran counter to conventional wisdom, but which turned out to be true.

Impressed, the firm's top executives put into effect a new policy based on the analysts' recommendations. From now on, when orders fell, they would maintain production rates and try to improve delivery performance. During the 1970 recession, the experiment worked. Thanks to prompt deliveries and more repeat buying from satisfied customers, the firm's market share increased. The managers were so pleased that they set up their own systems group. But the new policies were never taken to heart, and the improvement proved temporary. During the ensuing business recovery, the managers stopped worrying about delivery service. Four years later, when the more severe OPEC-induced recession came, they went back to their original policy of dramatic production cutbacks.

Why discard such a successful experiment? The reason was the mental models deeply embedded in the firm's management traditions. Every production manager knew in his heart that there was no more sure-fire way to destroy his career than to be held responsible for stockpiling unsold goods in the warehouse. Generations of top management had preached the gospel of commitment to inventory control. Despite the new experiment, the old mental model was still alive and well.

The inertia of deeply entrenched models can overwhelm even the best systemic insights. This has been a bitter lesson for many a purveyor of new management tools, as well as for systems thinking advocates.

But if mental models can impede learning--freezing companies and industries in outmoded practices--why can't they also help accelerate learning? As it happens, several organizations, largely operating independently, have given serious attention to this question in recent years.

Incubating a New Business Worldview

Perhaps the first large corporation to discover the potential power of mental models in learning was Royal Dutch/Shell. Managing a highly decentralized company through the turbulence of the world oil business in the 1970s, Shell found that, by helping managers clarify their assumptions, uncover internal contradictions in those assumptions, and think through new strategies based on new assumptions, they gained a unique source of competitive advantage.

Shell is unique in several ways that have made it a natural environment for experimenting with mental models. It is truly multicultural, formed originally in 1907 from a "gentlemen's agreement" between Royal Dutch Petroleum and the London-based Shell Transport and Trading Company. Royal Dutch/Shell now has more than a hundred operating companies around the world, led by managers from almost as many different cultures.

The operating companies enjoy a high degree of autonomy and local independence. From the beginning, Shell managers had to learn to operate by consensus, because there was no way these "gentlemen" from different countries and cultures would be able to tell each other what to do. As Shell grew and became more global and more multicultural, its needs for building consensus across vast gulfs of style and understanding grew.

In the turbulent early 1970s, Shell's tradition of consensus management was stretched to the breaking point. What emerged was a new understanding of the underpinnings of real consensus--an understanding of shared mental models. "Unless we influenced the 'mental image, the picture of reality held by critical decision makers, our scenarios would be like water on a stone," recalled Shell's former senior planner Pierre Wack, in his seminal Harvard Business Review articles about the firm's mental models. Wack had come to this realization in 1972, as he and his colleagues desperately faced their failure to convey to Shell's managers the "discontinuities" they foresaw in the world oil market. That was the year before OPEC and the onset of the energy crisis.

In principle, as the central planning department responsible for coordinating planning activities in operating companies worldwide, Shell's "Group Planning" staff was in an ideal position to disseminate insights about the changes ahead. At the time, Group Planning was developing a new technique called "scenario planning," a method for summarizing alternative future trends. However, as they began to build the coming discontinuities into their scenarios, their audience of Shell managers found these new scenarios so contradictory to their years of experience with predictable growth that they paid them little attention.

Wack and his colleagues now realized that they had fundamentally misperceived their task. Wack wrote that, from that moment, "We no longer saw our task as producing a documented view of the future.... Our real target was the 'microcosms' [Wack's term for mental models] of our decision makers.... We now wanted to design scenarios so that managers would question their own model of reality and change it when necessary." If the planners had once thought their job was delivering information to the decision makers, it was now clear that their task was to help managers rethink their world view. In particular, the Group Planners developed a new set of scenarios in January-February of 1973 that forced Shell's managers to identify all of the assumptions that had to be true in order for the managers' "trouble-free" future to occur. In the process, the managers realized that they were holding on to a set of assumptions only slightly more likely to come true than a fairy tale.

Group Planning now began building a new set of scenarios, carefully designed to take off from the current mental models of Shell managers. These scenarios demonstrated how the prevailing view that "the oil business would continue as usual" was based on outdated assumptions about the nature of global geopolitics and the oil industry. The

scenarios next led the managers to a clear understanding that these assumptions could not possibly hold in the future that was coming.

The planners then helped the managers begin the process of constructing a new mental model by helping them think through how they would have to manage in this new world. For example, exploration for oil would have to expand to new countries, while refinery building would have to expand to new countries, while refinery building would have to slow down because of higher prices and consequently slower demand growth. Also, with greater instability, nations would respond differently. Some, with free-market traditions, would let the price rise freely; others with controlled-market policies, would try to keep it low. Thus, more control would have to be given to Shell's locally based operating companies to enable them to adapt to local conditions.

Although many Shell managers remained skeptical, they took the new scenarios seriously because they began to see that their present views were untenable. The scenario exercises had begun to unfreeze the managers' mental models, and this, in turn, allowed them to begin to incubate a new world view.

When the OPEC oil embargo suddenly became a reality in the winter of 1973-74, Shell responded differently from the other oil companies. They slowed down their investments in refineries, and redesigned refineries to adapt to whatever type of crude oil was available. They produced forecasts of energy demands consistently showing lower levels than their competitors did--and consistently more accurately. In addition, they quickly accelerated development of oil fields outside OPEC.

While competitors reined in their divisions and further centralized their control--a common response to the crisis--Shell did the opposite. This gave their operating companies more room to maneuver, while their competitors had less.

Shell's managers saw themselves entering a new era of supply shortages, lower growth, and price instability. Because they had come to expect the 1970s to be a decade of turbulence (Wack called it the decade of "the rapids"), they responded to the turbulence effectively. Shell had discovered the power of managing mental models.

The net result of Shell's efforts was nothing short of spectacular. In 1970, Shell had been considered the weakest of the seven largest oil companies. Forbes called it the "Ugly Sister" of the "Seven Sisters." By 1979, it was perhaps the strongest. Certainly Shell and Exxon were in a class by themselves. By the early 1980s, articulating managers' mental models had become an important part of the planning process at Shell. Six months before the collapse of oil prices in 1986, Shell's Group Planning, under the direction of coordinator Arie de Geus, produced a fictitious Harvard Business School-style case study of an oil company coping with a sudden world oil glut. Managers had to critique the oil company's decisions. Thus, once again, they prepared themselves mentally

for a reality that the planners suspected they might have to face.

The Discipline of Mental Models

Developing an organization's capacity to work with mental models involves both learning new skills and implementing institutional innovations that help bring these skills into regular practice. First, key assumptions about important business issues must be defined. This goal, predominant at Shell, is vital to any company, because the most crucial mental models in any organization are those shared by key decision makers. Those models, if unexamined, limit an organization's range of actions to what is familiar and comfortable. Second, Shell had to develop face-to-face learning skills.

Both sides of the discipline--business skills and interpersonal issues--are crucial. On the one hand, managers are inherently pragmatic. They are most motivated to learn what they need to learn in their business context. Training them in mental modeling, or "balancing inquiry and advocacy" with no connection to pressing business issues, will often be rejected. Or, it will lead to people's acquiring "academic" skills they have no reason to use. On the other hand, without the interpersonal skills, learning is still fundamentally adaptive, not generative. Generative learning, in my experience, requires managers

with reflection and inquiry skills, not just consultants and planners. Only then will people at all levels of a business be able to surface and challenge their mental models before external circumstances compel rethinking, which can often be too little, too late.

As more companies adopt these techniques, these two aspects of mental modeling will become increasingly integrated. In the meantime, based on the experience of Shell and other companies, we can begin to piece together the elements of an emerging discipline.

Managing Mental Models

Throughout an Organization

Institutionalizing the process of reflecting on and surfacing mental models requires the development of mechanisms that make these practices unavoidable. Two emerging approaches involve recasting traditional planning as a learning mode by establishing "internal boards of directors" that bring senior management and local management together regularly to challenge and expand the thinking behind local decision making.

Once Shell's planners had recognized the importance of articulating mental models, they had to develop ways to foster that articulation in over a hundred independent operating companies. The need for global reach is one factor behind Shell's unique approach to mental models, which involves developing and testing a variety of different tools in Group Planning in London, then disseminating them. Eventually, local planners master these tools for use with local company operating managers.

Scenarios, the first tool Shell adapted in pursuit of mental models, force managers to consider how they would manage under different alternative paths into the future. This offsets the tendency for managers to implicitly assume a single future. When groups of managers share a range of alternative futures in their mental models, they become more perceptive of changes in the business environment and more responsive to those changes. These are exactly the advantages that Shell enjoyed over its competitors during the postOPEC era.

Shell has institutionalized managing models through its planning process. Shell managers still generate traditional budget and control plans. But Arie de Geus and his colleagues have begun rethinking the role of planning in large institutions. It is less important, they have concluded, to produce perfect plans than to use planning to accelerate learning as a whole. Long-term success, according to De Geus, depends on "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." De Geus goes on to say that the critical question in planning is, "Can we accelerate institutional learning?"

Reflection and Inquiry Skills:

Managing Mental Models at Personal

and Interpersonal Levels

The learning skills needed to develop and manipulate mental models fall into two broad classes: Skills of reflection and skills of inquiry. Skills of reflection concern slowing down our own thinking processes so that we can become more aware of how we form our mental models and the ways they influence our actions. Inquiry skills concern how we operate in face-to-face interactions with others, especially in dealing with complex issues that could lead to conflict.

Skills of reflection begin with recognizing "leaps of abstraction."

Leaps of Abstraction. Our minds literally move at lightning speed. Ironically, this often slows our learning, because we immediately "leap" to generalizations so quickly that we never think to test them. The proverbial "castles in the sky" describes our own thinking far more often than we realize.

Leaps of abstraction are common with business issues. At one firm, many top managers were convinced that "Customers buy products based on price. The quality of service isn't a factor." And it's no wonder they felt that way-- customers continually pressed for deeper discounts, and competitors were continually attracting customers away with price promotions. When one marketer who was new to the company urged his

superiors to invest in improving service, he was turned down kindly but firmly. The senior leaders never tested the idea because their leap of abstraction—that customers don't care about service, they buy based on price---had become a "fact." As a result, they sat and watched while their leading competitor steadily increased its market share by providing a level of service quality that customers had never experienced and had therefore never thought to ask for.

Among high-tech companies there is a common belief that being first to market is the key to success. While this generalization is often based on concrete experience, it can also be misleading. Released in 1982, the Apple III computer (an improved version of the Apple II) was an innovative product. However, it had so many bugs it turned off would be customers, and the product turned out to be one of Apple's biggest disappointments. Yet, other computer manufacturers continue to rush products to market that were, if anything, even less ready. And some of those products were big winners, such as the Sun-3 workstation.

So, why does the generalization "first to market" stand up in some instances but not in others? Because the Sun-3's customers were sophisticated engineers who forgave bugs-- in part because they could fix them themselves. The Apple III's largest market, consumers and business people, was much more unforgiving. They needed the new system to work the first time out and were easily intimidated by a power machine that had the reputation of unreliability-- even though the bugs were fixed within a few months of being discovered.

How do you spot leaps of abstraction? First, by asking yourself what you believe about the way the world works-- the nature of business, people in general, and specific individuals. First, ask: "What is the data on which this generalization is based?" Then ask yourself: "Am I willing to consider that this generalization may be inaccurate or misleading?" It's important to ask this last question consciously because, if the answer is no, there's no point in proceeding.

If you're willing to question a generalization, your next step is to explicitly separate it from the data that led to its formation. For example, you might say: "Paul Smith, the purchaser for Bailey's Shoes, and several other customers have told me they won't buy our product unless we lower the price 10 percent. Thus, I conclude that our customers don't care about service quality." This puts all your cards on the table and gives you, and others, a better opportunity to consider alternative interpretations and courses of action.

Where possible, test the generalizations directly. This will often lead to inquiring into the reasons behind your own and other people's actions.

Balancing Inquiry and Advocacy. Most managers are trained to be advocates. In fact, in many companies, what it means to be a competent manager is the ability to solve problems figuring out what needs to be done, and enlisting whatever support is needed to get it done. Individuals often become successful in part because of their abilities to debate forcefully and thus influence others. Meanwhile, inquiry skills go unrecognized and unrewarded.

But as managers rise to senior positions, they find themselves confronted with issues more complex and diverse than their personal experience has yet prepared them for. Suddenly, they need to tap the insights of other people. They find that they need to learn. Suddenly, the advocacy skills we developed as managers have become counterproductive. They can actually close us off from learning from one another. What is needed now is the flexibility to blend advocacy with inquiry in order to promote collaborative learning.

Even when two advocates meet for an open, candid exchange of views, quite often there is little learning taking place. While they may be genuinely interested in each other's views, the habit of pure advocacy lends a different type of structure to the conversation. For example:

"I appreciate your sincerity, but my experience and judgment lead me to some different conclusions. Let me tell you why your proposal won't work "

As each side reasonably and calmly advocates his viewpoint just a bit more strongly, positions become more and more rigid. Advocacy without

inquiry begets more advocacy. In fact, there is a systems archetype that describes what happens next. It's called "escalation," and it's exactly the same structure that fuels an arms race.

The more vehemently A argues, the greater the threat to B. Thus, B argues more fiercely. Then A counter argues even more fiercely. And so on. Managers often find escalations so grueling that, thereafter, they avoid stating any differences publicly. "It causes too much grief," they'll tell you.

The snowball effect of reinforcing advocacy can be stopped by beginning to ask a few simple questions, such as: "What is it that leads you to that position?" and "Can you illustrate your point for me?" [In other words, can you provide some data or experience in support of it?] This approach can interject an element of inquiry into what began as an advocacy proceeding.

We often tape record meetings of management teams with whom we are working to develop learning skills. One indicator that a team is in trouble is when few, if any, questions emerge during the course of a several hour meeting. This may seem amazing, but I have seen meetings that went for three hours without a single question being asked] You don't have to be an "action science" expert to know there's not a lot of inquiry going on in such meetings.

But pure inquiry is also limited. Questioning can be crucial for breaking the spiral of reinforcing advocacy, but until a team or an individual learns to combine and integrate both inquiry and advocacy skills, learning is very limited. One reason that pure inquiry is limited is that we almost always do have a view, regardless of whether or not we believe that our view is the only correct one. Thus, simply asking lots of questions can be a way of avoiding learning by hiding our own view behind a wall of incessant questioning.

The most productive learning usually occurs when managers combine skills in advocacy and inquiry. Another way to say this is "reciprocal inquiry." By this we mean that everyone makes his or her thinking explicit and subject to public examination. This creates an atmosphere of genuine vulnerability. No one is hiding the evidence or reasoning behind his views --advancing them without making them open to scrutiny. For example, when inquiry and advocacy are balanced, I would not only be inquiring into the reasoning behind others' views, I would also be stating my views in a way that both revealed my own assumptions and reasoning and invited others to inquire into them. For instance, I might say: "Here's what I think, and here's how I have arrived at it. How does it sound to you?"

When operating in pure advocacy, the goal is to win the argument. When inquiry and advocacy are combined, the goal is no longer winning, but rather finding the best argument. This balanced goal is reflected in how we use data, and in how we reveal the reasoning behind abstractions. For example, when we operate in pure advocacy, we tend to use data selectively, presenting only the data that confirm our position. When we explain the reasoning behind our position, we expose only enough of our reasoning to "make our case," avoiding areas where we feel it might be weak. By contrast, when both advocacy and inquiry are high, we are open to disconfirming data as well as confirming data-- because we are genuinely interested in finding flaws in our views. Likewise, we expose our reasoning and look for flaws in it, and we try to understand others' reasoning.

The ideal of combining inquiry and advocacy is challenging. It can be especially difficult if you work in a highly political organization that is not open to genuine inquiry. Speaking as a veteran advocate, I can say that I have found patience and perseverance are needed to move toward a more balanced approach. Progress comes in stages. For me, the first stage was learning how to inquire into others' views when I found I didn't agree with them. My habitual response to such disagreements was to advocate my view harder. Usually, this was done not with malice but in the genuine belief that I had thought things through and had a valid position. Unfortunately, it often had the consequence of polarizing or terminating discussions, and left me without the sense of partnership I truly wanted. Now, very often I respond to differences of view by asking

other people to say more about how they came to this view, or to expand further on it. (I'm only just beginning to get to the second stage where I'm able to state my views in such a way that I invite others to inquire into them as well.)

Though I'm still a novice in the discipline of balancing inquiry and advocacy, the rewards have been gratifying. What has become obvious on repeated occasions is that, when genuine inquiry and advocacy are present, creative outcomes are much more likely. In a sense, when two people operate in pure advocacy, the outcomes are predetermined. Either person A will win, or person B will win, or both will simply retain their views. But when there is inquiry and advocacy, these limitations dissolve. By being open to inquire into their own views, A and B create an atmosphere in which it is possible to blend views and even to come up with completely new views.

While mastering the discipline of balancing inquiry and advocacy, I've found that it helps to keep the following guidelines in mind:

When advocating your view:

- * Make your own reasoning explicit (that is, say how you arrived at your view and the data upon which it is based).
- * Encourage others to explore your view (for example, "Do you see gaps in my reasoning?")
- * Encourage others to provide different views ("Do you have either different data or different conclusions, or both?")
- * Actively inquire into others' views that differ from your own ("What are your views?" "How did you arrive at your view?" "Are you taking into account data that are different from what I have considered? If so, could you tell me what they are?")

When inquiring into others' views:

- * If you are making assumptions about others' views, state your assumptions clearly and acknowledge that they are assumptions.
- * State the data upon which your assumptions are based.
- * Don't bother asking questions if you're not genuinely interested in the others' response (that is, if you're only trying to be polite or to show the other person up).

When you arrive at an impasse (other people no longer appear to be open to inquiring into their own views):

- * Ask what data or logic might change their views.
- * Ask if there is any way that together you might be able to design an experiment (or some other inquiry) that could provide new information.

When you or others are hesitant to express your views or to experiment with alternative ideas:

- * Encourage others (or yourself) to think out loud about what might be causing the difficulties ("What is it about this situation, and/or about me or others, that is making open exchange difficult?")
- * If there is mutual desire to do so, work with others to design innovative ways of overcoming these barriers.

The point is not to follow such guidelines slavishly, but to use them to keep in mind the spirit of balancing inquiry and advocacy. Like any formula for starting on one of the learning disciplines, they should be used as "training wheels" on your first bicycle. They help to get you started, and to give you a feel for what it's like to ride--to practice inquiry with advocacy. As you gain skill, these formulas can and probably should be discarded. But it's nice to be able to come back to them periodically when you encounter some rough terrain.

However, it is important to keep in mind that guidelines will be of little use if you are not genuinely curious and willing to change your mental model of a situation. In other words, the true practice of inquiry and advocacy means being willing to expose the limitations in your own thinking--the willingness to be wrong. Nothing less will make it safe for others to do likewise.

Espoused Theory Versus Theory-in-Use. Learning eventually results in changes in action, not just taking in new information and forming new ideas." That's why recognizing the gap between our espoused theories (what we say) and our "theories-in-use" (the theories that underlie our actions) is vital. Otherwise, we may believe we've learned something because we've got the new language or concepts to use, although our

behavior may be completely unchanged.

For example, I may profess a view (an espoused theory) that people are basically trustworthy. On the other hand, in my daily life I may never lend friends money, and jealously guard all my possessions. Obviously, my theory-in-use--my deeper mental model--differs from my espoused theory.

While gaps between espoused theories and theories-in-use might be cause for discouragement, or even cynicism, they needn't be. Often they arise as a consequence of vision, not hypocrisy. For example, it may be truly part of my vision to trust people. If so, the gap between this aspect of my vision and my current behavior holds the potential for creative change. The problem lies not in the gap but in failing to recognize and tell the truth about the gap. Until the gap between my espoused theory and my current behavior surfaces consciously, no learning can occur.

So the first question to pose when facing a gap between espoused theory and theory-in-use is: "Do I really value the espoused theory?" "Is it really part of my vision?" If there is no commitment to the espoused theory, then the gap does not represent a tension between reality and my vision. Rather, it may be a view I simply say I espouse, perhaps because of how it will make me look to others.

Because it's so hard to see theories-in-use, we often need the help of another person--a "ruthlessly compassionate" partner. In the quest to develop skills in reflection, we are each others' greatest assets.

RECOGNIZING DISCONTINUITY

After analyzing long-term trends of oil production and consumption, Pierre Wack, former senior planner at Shell, concluded that the stable, predictable world familiar to Shell's managers was about to change. Europe, Japan, and the U.S. were becoming increasingly dependent on oil imports. Oil-exporting nations such as Iran, Iraq, Libya, and Venezuela were becoming increasingly concerned with failing reserves. Others, such as Saudi Arabia, were reaching the limits of their ability to productively invest oil revenues.

These trends meant that the historical, smooth growth in oil demand and supply would eventually give way to chronic supply shortfalls, excess demand, and a "seller's market" controlled by the oil-exporting nations. While Shell's planners didn't quite predict the emergence of OPEC, they did foresee the types of changes that an OPEC would eventually bring about. Yet, despite attempts to impress upon Shell's managers the likelihood of radical shifts ahead, "no more than a third of Shell's critical decision centers" acted upon the new insights.

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