

Strategy as a Wicked Problem

Over the past 15 years, I've been studying how companies create strategy—the most important responsibility of senior executives. Many corporations, I find, have replaced the annual top-down planning ritual, based on macroeconomic forecasts, with more sophisticated processes. They crunch vast amounts of consumer data, hold planning sessions frequently, and use techniques such as competency modeling and real-options analysis to develop strategy. This type of approach is an improvement because it is customer- and capability-focused and enables companies to modify their strategies quickly, but it still misses the mark a lot of the time.

Companies tend to ignore one complication along the way: They can't develop models of the increasingly complex environment in which they operate. As a result, contemporary strategic-planning processes don't help enterprises cope with the big problems they face. Several CEOs admit that they are confronted with issues that cannot be resolved merely by gathering additional data, defining issues more clearly, or breaking them down into small problems. Their planning techniques don't generate fresh ideas, and implementing the solutions those processes come up with is fraught with political peril. That's because, I believe, many strategy issues aren't just tough or persistent—they're "wicked."

Wickedness isn't a degree of difficulty. Wicked issues are different because traditional processes can't resolve them, according to Horst W.J. Rittel and Melvin M. Webber, professors of design and urban planning at the University of California at Berkeley, who described them in a 1973 article in *Policy Sciences* magazine. A wicked problem has innumerable causes, is tough to describe, and doesn't have a right answer, as we will see in the next section. Environmental degradation, terrorism, and poverty—these are classic examples of wicked problems. They're the opposite of hard but ordinary problems, which people can solve in a finite time period by applying standard techniques. Not only do conventional processes fail to tackle wicked problems, but they may exacerbate situations by generating undesirable consequences.

In the areas of public policy, software development, and project design, experts such as Peter DeGrace, Leslie Hulet Stahl, and Jeff Conklin have developed ways of spotting wicked problems and coping with them. DeGrace and Stahl wrote *Wicked Problems, Righteous Solutions: A Catalogue of Modern Software Engineering Paradigms* (1990); Conklin authored *Dialogue Mapping: Building Shared Understanding of Wicked Problems* (2006). Policy makers, in particular, have put this powerful concept to good use, but it has been largely missing from strategy discussions. Although many of the problems companies face are intractable, they have been slow to acknowledge the wickedness of strategy issues.

Between 1995 and 2005, I completed three research projects that provided insights into wicked strategy problems. First, as part of benchmarking projects that the APQC (formerly known as the American Productivity & Quality Center) and the Hong Kong Productivity Council conducted, I analyzed 22 North American, European, and Asian enterprises that use innovative strategic-planning techniques. They include ABB, Alcoa, Honeywell, John Deere, PPG Industries, Royal Dutch Shell, Siemens, Sprint, Whirlpool, and Xerox (China and USA). Second, I studied strategy implementation in depth at seven of these enterprises. Third, a colleague, Gaurab Bhardwaj, and I tracked DuPont's pharmaceuticals business to learn how companies draw up strategies when returns will accrue only in the long run and are highly uncertain. Based on these studies, I'll explore in the following pages how companies can tame—since they can't solve—such problems. I'll conclude by describing a planning process that helps PPG Industries tackle wicked issues.

What Is a Wicked Problem?

There are several ways to define a wicked problem, but according to Rittel and Webber, it has some or all of 10 characteristics. (See the sidebar "The 10 Properties of Wicked Problems.") Caveat: The criteria are not a set of tests that mechanically determine wickedness; rather, they provide insights that help you judge whether a problem is wicked.

In 1973, Horst W.J. Rittel and Melvin M. Webber, two Berkeley professors, published an article in *Policy Sciences* introducing the notion of "wicked" social problems. The article, "Dilemmas in a General Theory of Planning," named 10 properties that distinguished wicked problems from hard but ordinary problems.

1. There is no definitive formulation of a wicked problem. It's not possible to write a well-defined statement of the problem, as can be done with an ordinary problem.

2. Wicked problems have no stopping rule. You can tell when you've reached a solution with an ordinary problem. With a wicked problem, the search for solutions never stops.

3. Solutions to wicked problems are not true or false, but good or bad. Ordinary problems have solutions that can be objectively evaluated as right or wrong. Choosing a solution to a wicked problem is largely a matter of judgment.

4. There is no immediate and no ultimate test of a solution to a wicked problem. It's possible to determine right away if a solution to an ordinary problem is working. But solutions to wicked problems generate unexpected consequences over time, making it difficult to measure their effectiveness.

5. Every solution to a wicked problem is a "one-shot" operation; because there is

no opportunity to learn by trial and error, every attempt counts significantly.

Solutions to ordinary problems can be easily tried and abandoned. With wicked problems, every implemented solution has consequences that cannot be undone.

6. Wicked problems do not have an exhaustively describable set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan. Ordinary problems come with a limited set of potential solutions, by contrast.

7. Every wicked problem is essentially unique. An ordinary problem belongs to a class of similar problems that are all solved in the same way. A wicked problem is substantially without precedent; experience does not help you address it.

8. Every wicked problem can be considered to be a symptom of another problem. While an ordinary problem is self-contained, a wicked problem is entwined with other problems. However, those problems don't have one root cause.

9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. A wicked problem involves many stakeholders, who all will have different ideas about what the problem really is and what its causes are.

10. The planner has no right to be wrong. Problem solvers dealing with a wicked issue are held liable for the consequences of any actions they take, because those actions will have such a large impact and are hard to justify.

Wicked problems often crop up when organizations have to face constant change or unprecedented challenges. They occur in a social context; the greater the disagreement among stakeholders, the more wicked the problem. In fact, it's the social complexity of wicked problems as much as their technical difficulties that make them tough to manage. Not all problems are wicked; confusion, discord, and lack of progress are telltale signs that an issue might be wicked.

In my consulting work, I've found that when five characteristics are present in a strategy-related issue, executives agree they have a wicked problem on their hands. I'll list the key criteria below and use them to show how the challenge of growth that Wal-Mart faces today may well be wicked.

The problem involves many stakeholders with different values and priorities.

As Wal-Mart tries to grow faster, numerous stakeholders are watching nervously: employees and trade unions; shareholders, investors, and creditors; suppliers and joint venture partners; the governments of the U.S. and other nations where the retailer operates; and customers. That's not all; many nongovernmental organizations, particularly in countries where the retailer buys products, are closely monitoring it.

Wal-Mart's stakeholders have different interests, and not all of them share the company's goals. Each group possesses the capacity, in varying degrees, to influence the company's choices and results. That wasn't the case in 1962, when Sam Walton set up his first store in Rogers, Arkansas.

The issue's roots are complex and tangled.

Wal-Mart's slowing growth in the U.S. is a consequence of, among other things, a saturated market, its customers' limited disposable incomes, and intense competition from rivals such as Target and Costco. Wal-Mart also faces resistance to imports, criticism about the wages and benefits it offers employees, and charges that illegal aliens work in its stores. All this has generated unfavorable publicity and strengthened people's opposition to Wal-Mart's opening stores in urban areas. Compounding the challenge, some of the company's advantages have turned into disadvantages. For instance, Wal-Mart's large market share in some product categories makes it tough to grow same-store sales rapidly. Its low-cost sourcing practices have rendered it vulnerable to the health and safety concerns that surround products made in China. Its supply chain expertise doesn't help in the case of fashion and organic products, and its low-price image hurts its ability to sell upscale products. Moreover, Wal-Mart's deep roots in rural America are of little use in overseas markets.

The problem is difficult to come to grips with and changes with every attempt to address it.

Wal-Mart has several options. It can try to boost revenues and profits by increasing sales from existing stores or raising prices, by expanding into urban markets in the U.S., by entering emerging economies, by diversifying into upscale product lines and creating new store brands, by forecasting better, or by cutting suppliers' margins. These strategies demand different capabilities, are risky, and sometimes conflict with one another.

Consider two of the least complex options before Wal-Mart. It could boost profits by hiking prices, but until now, everyday low prices have helped the company fend off rivals. If consumers resist higher prices, the retailer's sales will fall and profits will drop. To prevent that, Wal-Mart must first modify its value proposition, stock some upscale products, and develop a brand persona that warrants higher prices—challenges that have little to do with boosting profits immediately. Alternatively, Wal-Mart could enter a fast-growing emerging market, as it has done in India. It has found the going tough there, however. In India, local laws don't allow foreign companies to operate multibrand retail outlets, so Wal-Mart has had to develop a special business model: cash-and-carry wholesale stores for local retailers. Besides being unfamiliar, the strategy contains the nucleus of another problem. When India's laws change and allow Wal-Mart to sell to consumers, it will have to compete with the retailers it supplies.

The challenge has no precedent.

The two strategies we just discussed pose completely new challenges for the company. For instance, Wal-Mart would have to alter its brand image—for the first time in its 46-year history—to justify higher prices. Its recent foray into higher-priced garments is an experiment and doesn't appear to have worked. Similarly, Wal-Mart's India strategy differs from the M&A strategy it has used to enter other developing countries. Wal-Mart is a novice at managing partnerships, but it has had to team up with an Indian conglomerate, Bharti Enterprises. The group, whose primary business is telecommunications, wants to tap Wal-Mart's expertise to set up a supply chain to get Indian produce onto Western tables! Wal-Mart will have to work with India's bureaucracy to build the infrastructure that will support its operations, but in the past, dealing with governments hasn't been the company's strong suit.

There's nothing to indicate the right answer to the problem.

In Wal-Mart's case, going upmarket could boost profits, but it isn't easy for a discount chain to develop a relationship with higher-income shoppers. Moreover, the retailer cannot ignore its existing consumers, who shop at Wal-Mart for inexpensive products. How much of a focus on higher-margin products and higher-income customers is appropriate? The company has no way of knowing that in the beginning. In like vein, Wal-Mart's India strategy may be an effective way to enter a number of rapidly developing economies. However, the company will lose some of its competitive advantage when it shares expertise with local partners. What's the optimal level of knowledge transfer? That's impossible to estimate; Wal-Mart will find out only after it has shared best practices—and possibly created new rivals.

Growth is a hard problem for many companies, but it may not always be wicked. In Wal-Mart's case, as we have just seen, the challenge bears all the signs of wickedness.

Managing the Wickedness of Strategy

It's impossible to find solutions to wicked strategy problems, but companies can learn to cope with them. In accordance with Occam's razor, the simplest techniques are often the best.

Involve stakeholders, document opinions, and communicate.

Companies can manage strategy's wickedness not by being more systematic but by using social-planning processes. They should organize brainstorming sessions to identify the various aspects of a wicked problem; hold retreats to encourage executives and stakeholders to share their perspectives; run focus groups to better understand stakeholders' viewpoints; involve stakeholders in developing future scenarios; and organize design charrettes to develop and gain acceptance for possible

strategies. The aim should be to create a shared understanding of the problem and foster a joint commitment to possible ways of resolving it. Not everyone will agree on what the problem is, but stakeholders should be able to understand one another's positions well enough to discuss different interpretations of the problem and work together to tackle it.

Companies must go beyond obtaining facts and opinions from stakeholders; they should involve them in finding ways to manage the problem. Getting a variety of opinions helps companies develop novel perspectives. It also strengthens collective intelligence, which counteracts groupthink and cognitive bias and enables groups to tackle problems more effectively than individuals, as Tom Atlee, the founder and codirector of the Co-Intelligence Institute, and Howard Bloom, a visiting scholar at New York University, have pointed out. Involving more stakeholders makes the planning process more complex, but it also expands the potential for creativity. Buy-in is an important result; companies should look not only for countermeasures but also for stakeholders to get on board with some of them.

Companies believe that shareholders and customers are important stakeholders, but employees are even more crucial. Their tacit knowledge and commitment often help enterprises develop innovative strategies. Merrill Lynch Credit Corporation, for example, places a great deal of emphasis on semistructured social processes, frequently organizing social events and encouraging employees to interact with one another. Everyone lunches in the company cafeteria, which allows employees to mix with senior executives routinely. A company intranet supports virtual social interactions such as blog-based discussions.

It may seem trivial, but documenting stakeholders' assumptions, ideas, and concerns on an ongoing basis is important. It helps enterprises understand stakeholders' hidden assumptions and gauge the effectiveness of the actions they have taken. Documents also help executives communicate ideas, which is essential if plans are to become reality.

All planning processes are, at their core, vehicles for communication with employees at all levels and between business units. This is particularly true of processes that tackle wicked issues. Smart companies emphasize such communication. At John Deere, corporate planners say that the quality of senior executives' communications with divisions is the most important indicator of the effectiveness of strategy planning. Whirlpool believes that even the "janitor on the third shift" should be familiar with the company's strategic goals. So assembly lines at Whirlpool shut down on a regular basis to enable managers and workers to discuss the progress of plans. At Shell a global electronic network, organized into forums with moderators, allows hundreds of managers and planners to discuss planning issues. At Merrill Lynch Credit Corporation, the corporate planners' three most important rules for effective planning are simple:

“One, communicate! Two, communicate! And three, communicate!”

The documentation process is a good way to generate new ideas. It needn't be confined to recording decisions already reached; some companies have been creative in using the process to communicate the nature of the problems they face. In 2002 SAE International, an organization that sets standards and provides training in the automobile, aerospace, and commercial vehicle industries, was looking for new strategies. It commissioned a case study on its situation and then invited 30 senior executives with reputations for creative thinking to discuss the case with its top managers. SAE recorded the ideas that emerged during the session and has implemented several of them. Without the case study that captured the organization's dilemma, the brainstorming might not have been productive.

Define the corporate identity.

While a company dealing with a wicked problem has to experiment with many strategies, it must stay true to a sense of purpose. Mission statements are the foundations of strategy, but in a fast-changing world, companies change their “concept of business,” “scope of activities,” or “statement of purpose” more often than they used to. A company's identity, which serves as a touchstone against which it can evaluate its choices, is often a more enduring statement of strategic intent.

An organization's identity, like that of an individual, comprises the following:

- *Values.* What is fundamentally important to the company?
- *Competencies.* What does the company do better than others do?
- *Aspirations.* How does the company envision and measure success?

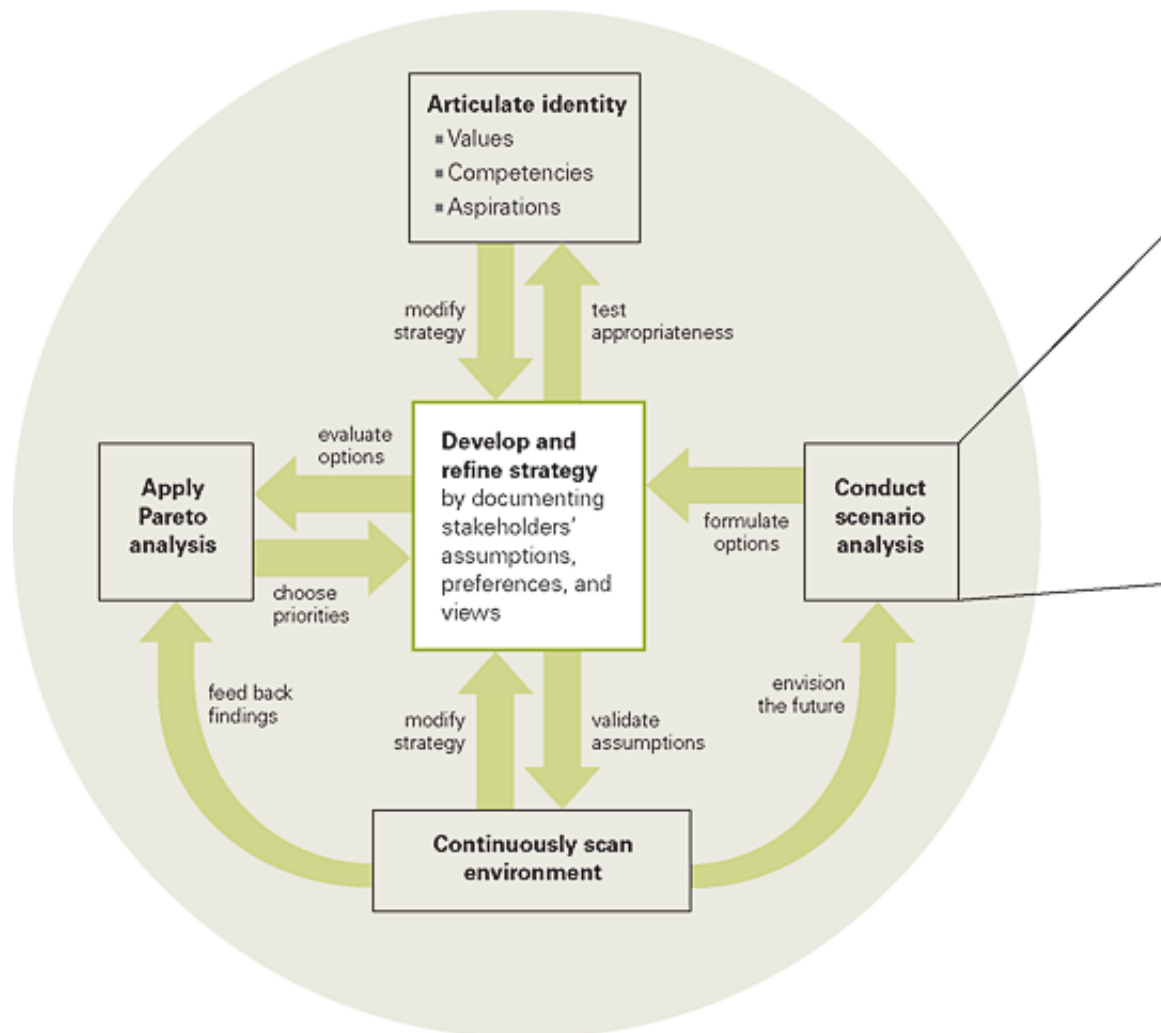
An identity provides executives with direction and focuses attention on opportunities and threats. For instance, in August 2007, Campbell Soup decided it would sell off the Godiva business. The company didn't base the decision on financial performance; Godiva is a superpremium chocolate brand and a profitable business. Trouble is, Campbell's values, competencies, and aspirations focus on nutrition and simplicity—and Godiva chocolates don't fit in with that self-image. “Although the premium chocolate category is experiencing strong growth and Godiva is well-positioned for the future, the premium chocolate business does not fit with Campbell's focus on simple meals,” explained Douglas R. Conant, Campbell Soup's CEO, while announcing the decision. In December 2007, the company reached an agreement to sell Godiva to Yildiz Holding, which owns the Turkish company Ülker Group, for \$850 million. By relying on its identity, rather than on financial projections, Campbell made the decision to sell Godiva quickly and painlessly.

Focus on action.

In a world of Newtonian order, where there is a clear relationship between cause and effect, companies can judge what strategies they want to pursue. In a wicked world of complex and shadowy possibilities, enterprises don't know if their strategies are appropriate or what those strategies' consequences might be. They should therefore abandon the convention of thinking through all their options before choosing a single one, and experiment with a number of strategies that are feasible even if they are unsure of the implications.

To pick a starting point, executives can borrow a leaf from policy makers. Bureaucrats focus on the few actions they will be able to take rather than the myriad options before them, Yale University's Charles Lindblom pointed out in 1959. Doing so enables policy makers to analyze options quickly and make decisions that meet the goals of several constituents. Calling it the science of muddling through, Lindblom argued that over time, governments will make progress by constantly making small policy changes. In a similar way, companies can formulate strategies that will deliver results in various scenarios—I call these robust actions—and use Pareto analysis to prioritize a small number of them that will produce the most impact. That's what PPG Industries does—as shown in the exhibit below, "PPG's Framework for Responding to Wicked Issues," and described later in this article.

PPG Industries develops strategies after seeking and documenting stakeholders' assumptions, preferences, and alternate views. It evaluates the appropriateness of the strategies it draws up against its statement of identity and continually scans the environment and tests assumptions to see if it needs to change course. The assessment of possible scenarios helps PPG formulate new options, and its managers apply Pareto analysis to identify a small number of actions that are likely to have a large impact.



However, even executives willing to embark on a number of robust actions often become indecisive when they realize that every response to a wicked issue will alter the problem the company faces and necessitate another change in strategy. They keep analyzing the issue rather than doing something about it. They would do better to try out some strategy as a starting point; the consequences will give them a better handle on the real problem they face. So, to tackle wicked problems, smart companies conduct experiments, launch innovative pilot programs, test prototypes—and make mistakes from which they can learn. Companies like GE and Fujitsu encourage risk taking and celebrate thoughtfully implemented initiatives even if they turn out to be business failures. These companies believe that unexpected and even unsatisfactory results contribute to organizational learning.

Adopt a “feed-forward” orientation.

Companies design planning systems to work based on feedback; they compare results with plans and take corrective actions. Though it’s a powerful source of learning, feedback has limited relevance in a wicked context. Feedback allows enterprises to refine fundamentally sound strategies; wicked problems require executives to come up with novel ones. Feedback helps people learn from the past; wicked problems arise from unanticipated, uncertain, and unclear futures. Feedback helps people learn in contexts such as the movie *Groundhog Day*, where the protagonist (Phil Connors)

encounters the same set of circumstances every day, which enables him to perfect his responses over time. Wicked problems arise in circumstances such as those in the TV series *Quantum Leap*, where the protagonist (Sam Beckett) finds himself in an unfamiliar time and place in each episode. Comprehending the challenge he faces is itself the initial problem.

To develop a feed-forward orientation as a complement to the feedback practices they currently use, corporations must learn to envision the future. In this variation of scenario planning, enterprises should describe the set of external and internal circumstances that they would like to see in the next 10, 20, or 50 years. This will open executives' minds to the range and unpredictability of possibilities that the future may bring. Enterprises must then pursue strategies that will increase the likelihood of those circumstances' becoming reality. For instance, in the early 1980s, Alcoa envisioned a future in which aluminum, rather than steel, would be automobile manufacturers' metal of choice. In 1982, it allied with Audi to make that happen. By the mid-1990s, the collaboration between the two companies had produced the breakthrough Audi Space Frame, an aluminum structure into which car body panels are integrated so that they can perform a load-bearing function, which later became the industry norm.

Wicked strategy issues don't occur according to a timetable. Companies must constantly scan the environment for weak signals rather than conduct periodic analyses of the business landscape. (See, for example, George S. Day and Paul J.H. Schoemaker, "Scanning the Periphery," HBR November 2005.) It's increasingly difficult to identify the boundaries of the arenas companies should watch. Changes in one industry or segment often affect companies in others. For instance, who could have imagined that changes brought about by the computer industry and the internet would affect the music industry so radically? Businesses should scan sources of regulatory and technological change in addition to monitoring suppliers, competitors, potential entrants, and customers all over the world.

To forge effective approaches to wicked issues, executives must explore and monitor the assumptions behind their strategies. One way of doing that is through discovery-driven planning, where executives list the assumptions underlying the revenues and income they expect and test the validity of each premise. (See Rita Gunther McGrath and Ian C. MacMillan, "Discovery-Driven Planning," HBR July–August 1995.) By sharing those assumptions, executives can better align decision making throughout the organization.

Case Study: How PPG Battles Wickedness

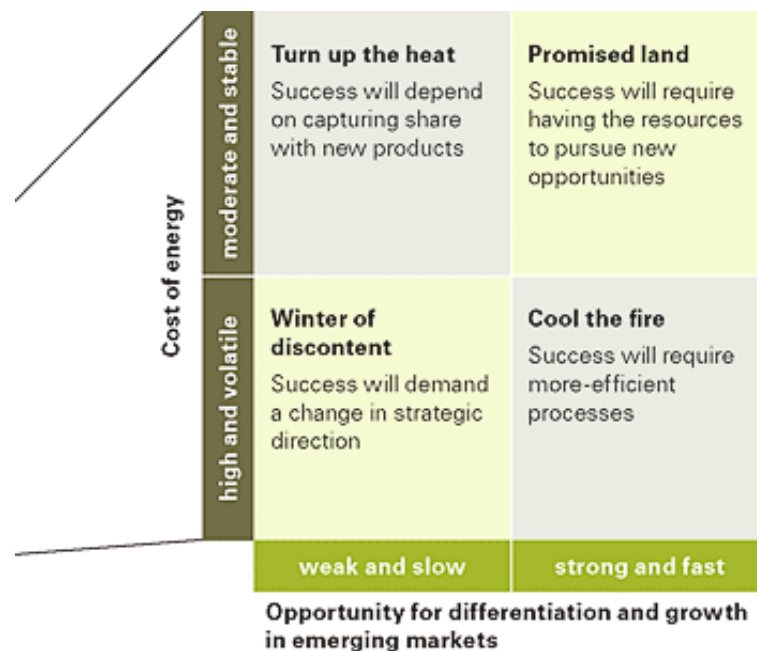
PPG Industries' strategic-planning practices constitute an effective response to wicked strategy issues. The company, founded over a century ago as a plate-glass manufacturer, makes chemicals and coatings too. With 125 manufacturing facilities

and partners in 25 countries, PPG is a global player. Although it operates in mature industries, the company has paid dividends every year since 1899—and has maintained or increased dividends every year since 1972.

PPG first became aware of strategy's wickedness in the late 1980s. Two missteps taught the company that diversification, be it into other industries or countries, is fraught with peril. Realizing that growth was slowing down, PPG expanded its portfolio by acquiring medical electronics businesses from Honeywell and Litton Industries in 1986 and from Allegheny International in 1987. However, the biomedical industry's volatility and the units' focus on customization didn't fit the company's competence in low-cost, standardized production. Seven years later, PPG had to sell the division. The company's other wicked challenge was China, where PPG's initial focus was glass. Although it entered the market in 1987, PPG's operations there were unprofitable until the mid-1990s. The company then realized that it would have to focus on coatings if it wanted to make money in China.

These experiences changed the company's approach to planning strategy in three ways. First, in the mid-1980s, PPG revisited its mission and articulated its identity in a document called the Blueprint. The company stated that it valued steady growth that met stakeholders' expectations; that it believed it was capable of achieving high levels of operational efficiency and using technology to develop innovations; and that it aspired to remain a profitable global player in all its businesses. Since then, PPG's identity has been more or less unchanged. The 2006 iteration mentioned the same core values and expressed a similar aspiration, with some modification in PPG's goals. It also identified a richer set of competencies. Although PPG's business portfolio has changed, with coatings assuming primacy over glass in the 2000s, its identity has endured.

To tackle wicked strategy problems, PPG Industries tries to envisage different futures it might face. In 2004, it drew up four possible scenarios by combining the biggest opportunity—namely, entering emerging markets—and the biggest challenge, the cost of energy, it would face in the next 10 years.



Cost of energy#moderate and stable#Turn up the heat*Success will depend on capturing share with new products#Promised land*Success will require having the resources to pursue new opportunities#high and volatile#Winter of discontent*Success will demand a change in strategic direction#Cool the fire*Success will require more-efficient processes##weak and slow#strong and fast##Opportunity for differentiation and growth in emerging markets

This allowed PPG to identify three strategies that will deliver results in any of the four circumstances:

- pursue operational excellence by emphasizing cost efficiency and quality;
- enhance differentiation through technology and service innovation; and

Second, PPG's plans have become living documents. They change frequently as the result of technology reviews conducted by teams of senior and R&D executives; examinations of the business portfolio at the corporate level; brainstorming sessions that promote fresh thinking by executives and employees; and scanning of markets, technologies, and regulatory issues by its three business units. PPG's executives say that the planning process is continuous, with the company constantly identifying problems and developing responses. The company often draws up possible scenarios and works to create the future it desires. The exhibit "PPG's Alternate Futures" shows the future scenarios it drew up in 2004 after making assumptions about two key variables: the cost of the energy required for its manufacturing operations and the extent of the opportunity to compete globally through differentiation. When PPG's senior executives studied the scenarios, they identified three kinds of actions that would deliver results in all four cases:

- Emphasize operational excellence through cost efficiency (using lean manufacturing techniques and improved logistics) and quality (through Six Sigma

programs).

- Enhance differentiation through technology-based innovations and new services that will meet customer needs.
- Generate cash to support strategic initiatives, to manage the portfolio of businesses, and to pay dividends.

Using Pareto analysis, PPG then identified the 20% of strategy options that would have 80% of the impact that could be derived from pursuing all of them. Developing a technology that would reduce the minimum efficient scale of its manufacturing facilities, executives felt, would be a key action. Reducing the scale would allow PPG to respond to a range of issues:

- It would enable the company to expand into countries and regions that lacked the demand to support the scale of its current technology.
- It would reduce warehousing and inventory levels as well as improve delivery times by allowing factories to be located closer to customers.
- It would use less energy in each location and disperse energy consumption.
- It would require lower levels of investment by the company.
- The efforts to reduce the scale would most likely give rise to newer, more efficient, and more reliable technologies.

Not surprisingly, PPG has invested heavily in developing such a technology.

PPG's approach to strategy is comprehensive, with the various techniques the company uses reinforcing one another and enabling it to beat back the wicked challenges it faces. Partly as a consequence, even though PPG operates in highly competitive markets, it reported revenues of \$11.2 billion in 2007—a 13% increase over 2006—and net income of \$834 million, compared with \$711 million in 2006. • • •

When confronting frustrating problems, an enterprise would do well to recognize that they may be wicked. Moving from denial to acceptance is important; otherwise, companies will continue to use conventional processes and never effectively address their strategy issues. Moreover, when executives look afresh at the problems they face, they shouldn't be shocked to find so many wicked ones. "The easy problems have been solved. Designing systems is difficult because there is no consensus on what the problems are, let alone how to solve them," wrote Mary Poppendieck, the lean-software development guru, in 2002. That's true for many businesses today.

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