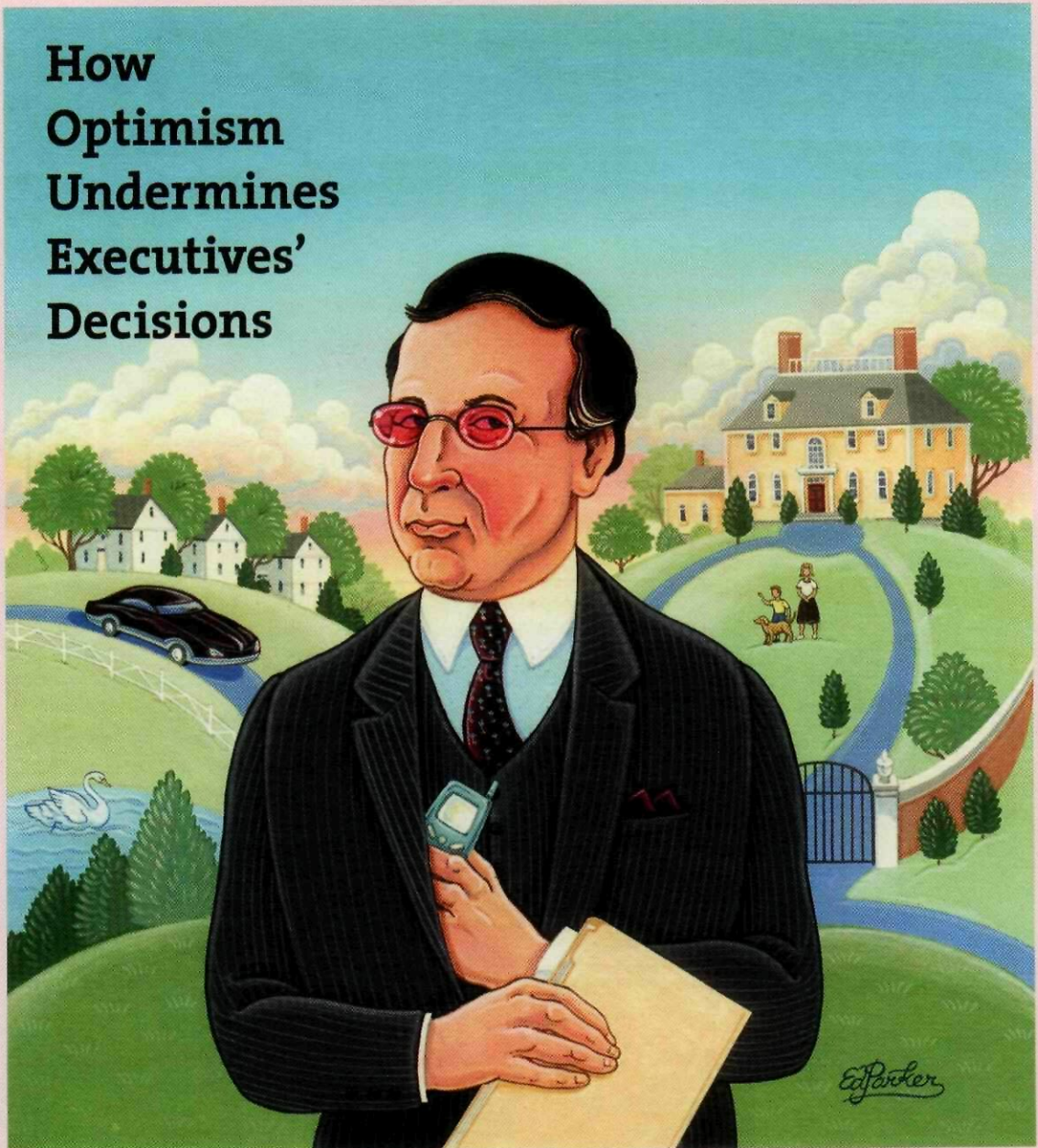


# Delusions of Success

How  
Optimism  
Undermines  
Executives'  
Decisions





In planning major initiatives, executives routinely exaggerate the benefits and discount the costs, setting themselves up for failure. Here's how to inject more reality into forecasting.

by Dan Lovallo and Daniel Kahneman

**I**N 1992, OXFORD HEALTH PLANS started to build a complex new computer system for processing claims and payments. From the start, the project was hampered by unforeseen problems and delays. As the company fell further behind schedule and budget, it struggled, vainly, to stem an ever rising flood of paperwork. When, on October 27, 1997, Oxford disclosed that its system and its accounts were in disarray, the company's stock price dropped 63%, destroying more than \$3 billion in shareholder value in a single day.



Early in the 1980s, the United Kingdom, Germany, Italy, and Spain announced that they would work together to build the Eurofighter, an advanced military jet. The project was expected to cost \$20 billion, and the jet was slated to go into service in 1997. Today, after nearly two decades of technical glitches and unexpected expenses, the aircraft has yet to be deployed, and projected costs have more than doubled, to approximately \$45 billion.

In 1996, the Union Pacific railroad bought its competitor Southern Pacific for \$3.9 billion, creating the largest rail carrier in North America. Almost immediately, the two companies began to have serious difficulties merging their operations, leading to snarled traffic, lost cargo, and massive delays. As the situation got worse, and the company's stock price tumbled, customers and shareholders sued the railroad, and it had to cut its dividend and raise new capital to address the problems.

Debacles like these are all too common in business. Most large capital investment projects come in late and over budget, never living up to expectations. More than 70% of new manufacturing plants in North America, for example, close within their first decade of operation. Approximately three-quarters of mergers and acquisitions never pay off—the acquiring firm's shareholders lose more than the acquired firm's shareholders gain. And efforts to enter new markets fare no better; the vast majority end up being abandoned within a few years.

According to standard economic theory, the high failure rates are simple to explain: The frequency of poor outcomes is an unavoidable result of companies taking rational risks in uncertain situations. Entrepreneurs and managers know and accept the odds because the rewards of success are sufficiently enticing. In the long run, the gains from a few successes will outweigh the losses from many failures.

This is, to be sure, an attractive argument from the perspective of executives. It effectively relieves them of blame for failed projects—after all, they were just taking reasonable risks. But having examined this phenomenon from two very different points of view—a business scholar's and a psychologist's—we have come to a different conclusion. We don't believe that the high number of business failures is best explained as the result of rational

**No matter how detailed, the business scenarios used in planning are generally inadequate.**

choices gone wrong. Rather, we see it as a consequence of flawed decision making. When forecasting the outcomes of risky projects, executives all too easily fall victim to what psychologists call the planning fallacy. In its grip, managers make decisions based on delusional optimism rather than on a rational weighting of gains, losses, and probabilities. They overestimate benefits and underestimate costs. They spin scenarios of success while overlooking the potential for mistakes and miscalculations.

As a result, managers pursue initiatives that are unlikely to come in on budget or on time—or to ever deliver the expected returns.

Executives' overoptimism can be traced both to cognitive biases—to errors in the way the mind processes information—and to organizational pressures. These biases and pressures are ubiquitous, but their effects can be tempered. By supplementing traditional forecasting processes, which tend to focus on a company's own capabilities, experiences, and expectations, with a simple statistical analysis of analogous efforts completed earlier, executives can gain a much more accurate understanding of a project's likely outcome. Such an *outside view*, as we call it, provides a reality check on the more intuitive *inside view*, reducing the odds that a company will rush blindly into a disastrous investment of money and time.

## Rose-Colored Glasses

Most people are highly optimistic most of the time. Research into human cognition has traced this overoptimism to many sources. One of the most powerful is the tendency of individuals to exaggerate their own talents—to believe they are above average in their endowment of positive traits and abilities. Consider a survey of 1 million students conducted by the College Board in the 1970s. When asked to rate themselves in comparison to their peers, 70% of the students said they were above average in leadership ability, while only 2% rated themselves below average. For athletic prowess, 60% saw themselves above the median, 6% below. When assessing their ability to get along with others, 60% of the students judged themselves to be in the top decile, and fully 25% considered themselves to be in the top 1%.

The inclination to exaggerate our talents is amplified by our tendency to misperceive the causes of certain events. The typical pattern of such attribution errors, as psychologists call them, is for people to take credit for positive outcomes and to attribute negative outcomes to external factors, no matter what their true cause. One study of letters to shareholders in annual reports, for example, found that executives tend to attribute favorable out-

*Dan Lovallo is a senior lecturer at the Australian Graduate School of Management at the University of New South Wales and a former strategy specialist at McKinsey & Company. Daniel Kahneman is the Eugene Higgins Professor of Psychology at Princeton University in New Jersey and a professor of public affairs at Princeton's Woodrow Wilson School; he received the Nobel Prize in economic sciences in 2002.*

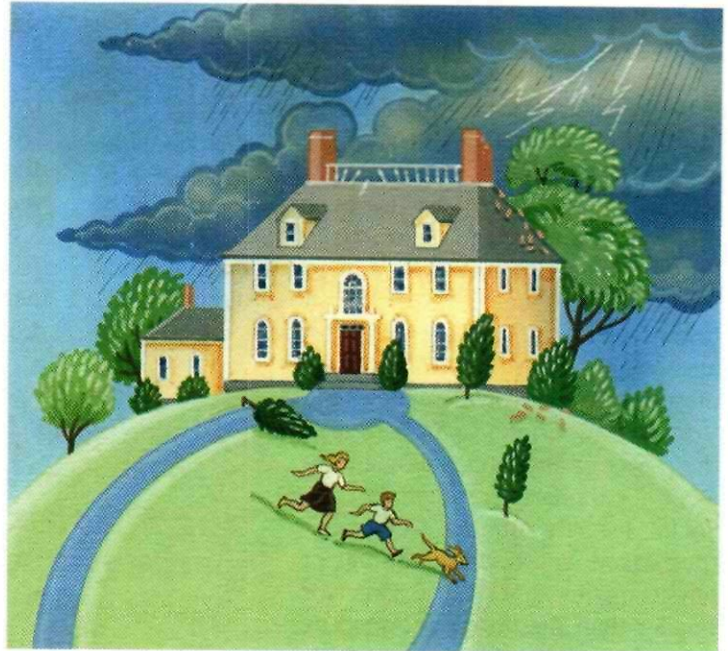


comes to factors under their control, such as their corporate strategy or their R&D programs. Unfavorable outcomes, by contrast, were more likely to be attributed to uncontrollable external factors such as weather or inflation. Similar self-serving attributions have been found in other studies of annual reports and executive speeches.

We also tend to exaggerate the degree of control we have over events, discounting the role of luck. In one series of studies, participants were asked to press a button that could illuminate a red light. The people were told that whether the light flashed was determined by a combination of their action and random chance. Afterward, they were asked to assess what they experienced. Most people grossly overstated the influence of their action in determining whether the light flashed.

Executives and entrepreneurs seem to be highly susceptible to these biases. Studies that compare the actual outcomes of capital investment projects, mergers and acquisitions, and market entries with managers' original expectations for those ventures show a strong tendency toward overoptimism. An analysis of start-up ventures in a wide range of industries found, for example, that more than 80% failed to achieve their market-share target. The studies are backed up by observations of executives. Like other people, business leaders routinely exaggerate their personal abilities, particularly for ambiguous, hard-to-measure traits like managerial skill. Their self-confidence can lead them to assume that they'll be able to avoid or easily overcome potential problems in executing a project. This misapprehension is further exaggerated by managers' tendency to take personal credit for lucky breaks. Think of mergers and acquisitions, for instance. Mergers tend to come in waves, during periods of economic expansion. At such times, executives can overattribute their company's strong performance to their own actions and abilities rather than to the buoyant economy. This can, in turn, lead them to an inflated belief in their own talents. Consequently, many M&A decisions may be the result of hubris, as the executives evaluating an acquisition candidate come to believe that, with proper planning and superior management skills, they could make it more valuable. Research on postmerger performance suggests that, on average, they are mistaken.

Managers are also prone to the illusion that they are in control. Sometimes, in fact, they will explicitly deny the role of chance in the outcome of their plans. They see risk as a challenge to be met by the exercise of skill, and they believe results are determined purely by their own actions and those of their organizations. In their idealized self-image, these executives are not gamblers but prudent and determined agents, who are in control of both people



and events. When it comes to making forecasts, therefore, they tend to ignore or downplay the possibility of random or uncontrollable occurrences that may impede their progress toward a goal.

The cognitive biases that produce overoptimism are compounded by the limits of human imagination. No matter how detailed, the business scenarios used in planning are generally inadequate. The reason is simple: Any complex project is subject to myriad problems—from technology failures to shifts in exchange rates to bad weather—and it is beyond the reach of the human imagination to foresee all of them at the outset. As a result, scenario planning can seriously understate the probability of things going awry. Often, for instance, managers will establish a “most likely” scenario and then assume that its outcome is in fact the most likely outcome. But that assumption can be wrong. Because the managers have not fully considered all the possible sequences of events that might delay or otherwise disrupt the project, they are likely to understate the overall probability of unfavorable outcomes. Even though any one of those outcomes may have only a small chance of occurring, in combination they may actually be far more likely to happen than the so-called most likely scenario.

## Accentuating the Positive

In business situations, people's native optimism is further magnified by two other kinds of cognitive bias—anchoring and competitor neglect—as well as political pressures to emphasize the positive and downplay the negative. Let's look briefly at each of these three phenomena.



**Anchoring.** When executives and their subordinates make forecasts about a project, they typically have, as a starting point, a preliminary plan drawn up by the person or team proposing the initiative. They adjust this original plan based on market research, financial analysis, or their own professional judgment before arriving at decisions about whether and how to proceed. This intuitive and seemingly unobjectionable process has serious pitfalls, however. Because the initial plan will tend to accentuate the positive—as a proposal, it's designed to make the case for the project—it will skew the subsequent analysis toward overoptimism. This phenomenon is the result of anchoring, one of the strongest and most prevalent of cognitive biases.

In one experiment that revealed the power of anchoring, people were asked for the last four digits of their Social Security number. They were then asked whether the number of physicians in Manhattan is larger or smaller than the number formed by those four digits. Finally, they were asked to estimate what the number of Manhattan physicians actually is. The correlation between the Social Security number and the estimate was significantly positive. The subjects started from a random series of digits and then insufficiently adjusted their estimate away from it.

Anchoring can be especially pernicious when it comes to forecasting the cost of major capital projects. When executives set budgets for such initiatives, they build in contingency funds to cover overruns. Often, however, they fail to put in enough. That's because they're anchored to their original cost estimates and don't adjust them sufficiently to account for the likelihood of problems and delays, not to mention expansions in the scope of the projects. One Rand Corporation study of 44 chemical-processing plants owned by major companies like 3M, DuPont, and Texaco found that, on average, the factories' actual construction costs were more than double the initial estimates. Furthermore, even a year after start-up, about half the plants produced at less than 75% of their design capacity, with a quarter producing at less than 50%. Many of the plants had their performance expectations permanently lowered, and the owners never realized a return on their investments.

**Competitor Neglect.** One of the key factors influencing the outcome of a business initiative is competitors' behavior. In making forecasts, however, executives tend to focus on their own company's capabilities and plans and are thus prone to neglect the potential abilities and actions of rivals. Here, again, the result is an underestimation of the potential for negative events—in this case,

price wars, overcapacity, and the like. Joe Roth, the former chairman of Walt Disney Studios, expressed the problem well in a 1996 interview with the *Los Angeles Times*: "If you only think about your own business, you think, 'I've got a good story department, I've got a good marketing department, we're going to go out and do this.' And you don't think that everybody else is thinking the same way."

Neglecting competitors can be particularly destructive in efforts to enter new markets. When a company identifies a rapidly growing market well suited to its products and capabilities, it will often rush to gain a

beachhead in it, investing heavily in production capacity and marketing. The effort is often justified by the creation of attractive pro forma forecasts of financial results. But such forecasts rarely account for the fact that many other competitors will also target the market, convinced that they, too, have what it takes to succeed. As all these companies invest, supply outstrips demand, quickly rendering the new market unprofitable. Even savvy venture capitalists fell into this trap during the recent ill-fated Internet boom.

**Organizational Pressure.** Every company has only a limited amount of

money and time to devote to new projects. Competition for this time and money is intense, as individuals and units jockey to present their own proposals as being the most attractive for investment. Because forecasts are critical weapons in these battles, individuals and units have big incentives to accentuate the positive in laying out prospective outcomes. This has two ill effects. First, it ensures that the forecasts used for planning are overoptimistic, which, as we described in our discussion of anchoring, distorts all further analysis. Second, it raises the odds that the projects chosen for investment will be those with the most overoptimistic forecasts—and hence the highest probability of disappointment.

Other organizational practices also encourage optimism. Senior executives tend, for instance, to stress the importance of stretch goals for their business units. This can have the salutary effect of increasing motivation, but it can also lead unit managers to further skew their forecasts toward unrealistically rosy outcomes. (And when these forecasts become the basis for compensation targets, the practice can push employees to behave in dangerously risky ways.) Organizations also actively discourage pessimism, which is often interpreted as disloyalty. The bearers of bad news tend to become pariahs, shunned and ignored by other employees. When pessimistic opinions are suppressed, while optimistic ones are rewarded, an organization's ability to think critically is undermined.

**When pessimistic opinions are suppressed, while optimistic ones are rewarded, an organization's ability to think critically is undermined.**



The optimistic biases of individual employees become mutually reinforcing, and unrealistic views of the future are validated by the group.

## The Outside View

For most of us, the tendency toward optimism is unavoidable. And it's unlikely that companies can, or would even want to, remove the organizational pressures that promote optimism. Still, optimism can, and should, be tempered. Simply understanding the sources of overoptimism can help planners challenge assumptions, bring in alternative perspectives, and in general take a balanced view of the future.

But there's also a more formal way to improve the reliability of forecasts. Companies can introduce into their planning processes an objective forecasting method that counteracts the personal and organizational sources of optimism. We'll begin our exploration of this approach with an anecdote that illustrates both the traditional mode of forecasting and the suggested alternative.

In 1976, one of us was involved in a project to develop a curriculum for a new subject area for high schools in Israel. The project was conducted by a small team of academics and teachers. When the team had been operating for about a year and had some significant achievements under its belt, its discussions turned to the question of how long the project would take. Everyone on the team was asked to write on a slip of paper the number of months that would be needed to finish the project—defined as having a complete report ready for submission to the Ministry of Education. The estimates ranged from 18 to 30 months.

One of the team members—a distinguished expert in curriculum development—was then posed a challenge by another team member: “Surely, we’re not the only team to have tried to develop a curriculum where none existed before. Try to recall as many such projects as you can. Think of them as they were in a stage comparable to ours at present. How long did it take them at that point to reach completion?” After a long silence, the curriculum expert said, with some discomfort, “First, I should say that not all the teams that I can think of, that were at a comparable stage, ever did complete their task. About 40% of them eventually gave up. Of the remaining, I cannot think of any that completed their task in less than seven years, nor of any that took more than ten.” He was then asked if he had reason to believe that the present team was more skilled in curriculum development than the earlier ones had been. “No,” he replied, “I cannot think of any relevant factor that distinguishes us favorably from the teams I have been thinking about. Indeed, my impression is that we are slightly below average in terms of resources and potential.” The wise decision at this point would probably have been for the team to disband. Instead, the members

ignored the pessimistic information and proceeded with the project. They finally completed the initiative eight years later, and their efforts went largely for naught—the resulting curriculum was rarely used.

In this example, the curriculum expert made two forecasts for the same problem and arrived at very different answers. We call these two distinct modes of forecasting the inside view and the outside view. The inside view is the one that the expert and all the other team members spontaneously adopted. They made forecasts by focusing tightly on the case at hand—considering its objective, the resources they brought to it, and the obstacles to its completion; constructing in their minds scenarios of their coming progress; and extrapolating current trends into the future. Not surprisingly, the resulting forecasts, even the most conservative ones, were exceedingly optimistic.

The outside view, also known as reference-class forecasting, is the one that the curriculum expert was encouraged to adopt. It completely ignored the details of the project at hand, and it involved no attempt at forecasting the events that would influence the project's future course. Instead, it examined the experiences of a class of similar projects, laid out a rough distribution of outcomes for this reference class, and then positioned the current project in that distribution. The resulting forecast, as it turned out, was much more accurate.

The contrast between inside and outside views has been confirmed in systematic research. Recent studies have shown that when people are asked simple questions requiring them to take an outside view, their forecasts become significantly more objective and reliable. For example, a group of students enrolling at a college were asked to rate their future academic performance relative to their peers in their major. On average, these students expected to perform better than 84% of their peers, which is logically impossible. Another group of incoming students from the same major were asked about their entrance scores and their peers' scores before being asked about their expected performance. This simple detour into pertinent outside-view information, which both groups of subjects were aware of, reduced the second group's average expected performance ratings by 20%. That's still overconfident, but it's much more realistic than the forecast made by the first group.

Most individuals and organizations are inclined to adopt the inside view in planning major initiatives. It's not only the traditional approach; it's also the intuitive one. The natural way to think about a complex project is to focus on the project itself—to bring to bear all one knows about it, paying special attention to its unique or unusual features. The thought of going out and gathering statistics about related cases seldom enters a planner's mind. The curriculum expert, for example, did not take the outside view until prompted—even though he already had all the information he needed. Even when companies



## How to Take the Outside View

**M**aking a forecast using the outside view requires planners to identify a reference class of analogous past initiatives, determine the distribution of outcomes for those initiatives, and place the project at hand at an appropriate point along that distribution. This effort is best organized into five steps:<sup>1</sup>

**1. Select a reference class.** Identifying the right reference class involves both art and science. You usually have to weigh similarities and differences on many variables and determine which are the most meaningful in judging how your own initiative will play out. Sometimes that's easy. If you're a studio executive trying to forecast sales of a new film, you'll formulate a reference class based on recent films in the same genre, starring similar actors, with comparable budgets, and so on. In other cases, it's much trickier. If you're a manager at a chemical company that is considering building an olefin plant incorporating a new processing technology, you may instinctively think that your reference class would include olefin plants now in operation. But you may actually get better results by looking at other chemical plants built with new processing technologies. The plant's outcome, in other words, may be more influenced by the newness of its technology than by what it produces. In forecasting an outcome in a competitive situation, such as the market share for a new venture, you need to consider industrial structure and market factors in designing a reference class. The key is to choose a class that is broad enough to be statistically meaningful but narrow enough to be truly comparable to the project at hand.

**2. Assess the distribution of outcomes.** Once the reference class is chosen, you have to document the outcomes of the prior projects and arrange them as a dis-

tribution, showing the extremes, the median, and any clusters. Sometimes you won't be able to precisely document the outcomes of every member of the class. But you can still arrive at a rough distribution by calculating the average outcome as well as a measure of variability. In the film example, for instance, you may find that the reference-class movies sold \$40 million worth of tickets on average, but that 10% sold less than \$2 million worth of tickets and 5% sold more than \$120 million worth.

**3. Make an intuitive prediction of your project's position in the distribution.**

Based on your own understanding of the project at hand and how it compares with the projects in the reference class, predict where it would fall along the distribution. Because your intuitive estimate will likely be biased, the final two steps are intended to adjust the estimate in order to arrive at a more accurate forecast.

**4. Assess the reliability of your prediction.** Some events are easier to foresee than others. A meteorologist's forecast of temperatures two days from now, for example, will be more reliable than a sportscaster's prediction of the score of next year's Super Bowl. This step is intended to gauge the reliability of the forecast you made in Step 3. The goal is to estimate the correlation between the forecast and the actual outcome, expressed as a coefficient between 0 and 1, where 0 indicates no correlation and 1 indicates complete correlation. In the best case, information will be available on how well your past predictions matched the actual outcomes. You can then estimate the correlation based on historical precedent. In the absence of such information, assessments of predictability become more subjective. You may, for instance, be able to arrive at an estimate of pre-

dictability based on how the situation at hand compares with other forecasting situations. To return to the movie example, say that you are fairly confident that your ability to predict the sales of films exceeds the ability of sportscasters to predict point spreads in football games but is not as good as the ability of weather forecasters to predict temperatures two days out. Through a diligent statistical analysis, you could construct a rough scale of predictability based on computed correlations between predictions and outcomes for football scores and temperatures. You can then estimate where your ability to predict film scores lies on this scale. When the calculations are complex, it may help to bring in a skilled statistician.

**5. Correct the intuitive estimate.**

Due to bias, the intuitive estimate made in Step 3 will likely be optimistic—deviating too far from the average outcome of the reference class. In this final step, you adjust the estimate toward the average based on your analysis of predictability in Step 4. The less reliable the prediction, the more the estimate needs to be regressed toward the mean. Suppose that your intuitive prediction of a film's sales is \$95 million and that, on average, films in the reference class do \$40 million worth of business. Suppose further that you have estimated the correlation coefficient to be 0.6. The regressed estimate of ticket sales would be:

$$\$95\text{M} + [0.6 (\$40\text{M} - \$95\text{M})] = \$62\text{M}$$

As you see, the adjustment for optimism will often be substantial, particularly in highly uncertain situations where predictions are unreliable.

1. This discussion builds on "Intuitive Predictions: Biases and Corrective Procedures," a 1979 article by Daniel Kahneman and Amos Tversky that appeared in *TIMS Studies in Management Science*, volume 12 (Elsevier/North Holland).



bring in independent consultants to assist in forecasting, they often remain stuck in the inside view. If the consultants provide comparative data on other companies or projects, they can spur useful outside-view thinking. But if they concentrate on the project itself, their analysis will also tend to be distorted by cognitive biases.

While understandable, managers' preference for the inside view over the outside view is **unfortunate**. When both forecasting methods are applied with equal intelligence and skill, the outside view is much more likely to yield a realistic estimate. That's because it **bypasses cognitive and organizational biases**. In the outside view, managers aren't required to weave scenarios, imagine events, or gauge their own levels of ability and control—so they can't get all those things wrong. And it doesn't matter if managers aren't good at assessing competitors' abilities and actions; the impact of those abilities and actions is already reflected in the outcomes of the earlier projects within the reference class. It's true that the outside view, being based on historical precedent, may fail to predict extreme outcomes—those that lie outside all historical precedents. But for most projects, the outside view will produce superior results.

The outside view's advantage is most pronounced for initiatives that companies have never attempted before—like building a plant with a new manufacturing technology or entering an entirely new market. It is in the planning of such *de novo* efforts that the biases toward optimism are likely to be great. Ironically, however, such cases are precisely where the organizational and personal pressures to apply the inside view are most intense. Managers feel that if they don't fully account for the intricacies of the proposed project, they would be derelict in their duties. Indeed, the preference for the inside view over the outside view can feel almost like a moral imperative. The inside view is embraced as a serious attempt to come to grips with the complexities of a unique challenge, while the outside view is rejected as relying on a crude analogy to superficially similar instances. Yet the fact remains: The outside view is more likely to produce accurate forecasts and much less likely to deliver highly unrealistic ones.

Of course, choosing the right class of analogous cases becomes more difficult when executives are forecasting initiatives for which precedents are not easily found. It's not like in the curriculum example, where many similar efforts had already been undertaken. Imagine that planners have to forecast the results of an investment in a new and unfamiliar technology. Should they look at their company's earlier investments in new technologies? Or should they look at how other companies carried out projects involving similar technologies? Neither is perfect,

but each will provide useful insights—so the planners should analyze both sets of analogous cases. We provide a fuller explanation of how to identify and analyze a reference class in the sidebar “How to Take the Outside View.”

## Putting Optimism in Its Place

We are not suggesting that optimism is bad, or that managers should try to root it out of themselves or their organizations. Optimism generates much more enthusiasm than it does realism (not to mention pessimism), and it enables people to be resilient when confronting difficult situations or challenging goals. Companies have to promote optimism to keep employees motivated and focused. At the same time, though, they have to generate realistic forecasts, especially when large sums of money are at stake. There needs to be a balance between optimism and realism—between goals and forecasts. Aggressive goals can motivate the troops and improve the chances of success, but outside-view forecasts should be

used to decide whether or not to make a commitment in the first place.

The ideal is to draw a clear distinction between those functions and positions that involve or support decision making and those that promote or guide action. The former should be imbued with a realistic outlook, while the latter will often benefit from a sense of optimism. An optimistic CFO, for example, could mean disaster for a company, just as a lack of optimism would undermine the visionary qualities essential for superior R&D and the *esprit de corps* central to a successful sales force. Indeed, those charged with implementing a plan should probably not even see the outside-view forecasts, which might reduce their incentive to perform at their best.

Of course, clean distinctions between decision making and action break down at the top. CEOs, unit managers, and project champions need to be optimistic and realistic at the same time. If you happen to be in one of these positions, you should make sure that you and your planners adopt an outside view in deciding where to invest among competing initiatives. More objective forecasts will help you choose your goals wisely and your means prudently.

Once an organization is committed to a course of action, however, constantly revising and reviewing the odds of success is unlikely to be good for its morale or performance. Indeed, a healthy dose of optimism will give you and your subordinates an advantage in tackling the challenges that are sure to lie ahead. ▢

**The outside view is more likely to produce accurate forecasts and much less likely to deliver highly unrealistic ones.**

Reprint R0307D; HBR OnPoint 4279

To order, see page 119.



Copyright 2003 Harvard Business Publishing. All Rights Reserved. Additional restrictions may apply including the use of this content as assigned course material. Please consult your institution's librarian about any restrictions that might apply under the license with your institution. For more information and teaching resources from Harvard Business Publishing including Harvard Business School Cases, eLearning products, and business simulations please visit [hbsp.harvard.edu](http://hbsp.harvard.edu).