

A Primer on the Management of Risk and Uncertainty

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Most business decisions are made with incomplete information and in the face of an uncertain future. Indeed, with the exception of a reasonable expectation that the sun will come up tomorrow, few things in human affairs can be predicted with certainty. Managers have to deal with risks every day. For example, a company may have perfected a new technology but consumer acceptance of the innovation is unknown; a competitor may be tempted to engage in direct competition with a firm or may decide that the profits of a divided market are too slim and go on to seek other opportunities. Uncertainty encompasses both identifiable trends whose depth and timing can only be guessed at and unforeseen sudden events whose effect is immediate.

A good example of the uncertain future is the competing views of long-term US common stock prices¹ (Text Box 1). One view is that the retirement of the “Baby Boom” generation (born 1946 – 1964) will cause tremendous downward pressure on stock prices as the boomers sell their investments to fund retirement. But some financial experts take the opposite view that the rising middle class in countries such as India and China will have hitherto unforeseen savings and will be seeking places to invest. The well-organized US equity markets will be attractive to these new investors and there will be plenty of buyers for any stocks that are sold. A third view is that the boomers will

be unlike any previous generations for whom increased affluence has led to earlier retirement. According to this vision, boomers will be inclined to work longer simply because they enjoy working and so there won't be a need to sell their holdings. Note that if we are trying to predict stock prices, we have to guess at three parameters: Whether boomers will be able to live on dividend income in retirement or will have to sell equities, how long boomers will work before starting retirement, and whether the economies of developing nations will produce a large investing middle class. No extrapolation from previous experience can easily reduce the uncertainty.

Text Box 1: An Uncertain Future for US Common Stock Prices

1. Baby Boomers will sell most of their stock holdings to fund retirement causing long-term drop in stock prices.
2. Stock prices will rise due to a huge demand for stocks as globalization creates a broader middle class in developing countries.
3. Baby boomers won't sell stocks in large amounts because they enjoy working and will be unlike previous generations and retire later.

The term “risk management” has come to serve as a set phrase in the financial services industry, referring to a formal process for evaluating and controlling a company’s total exposure to loss together with estimates of the probability of loss. However, “risk management” deserves to be reclaimed to a broader usage as all companies have to deal with risk. This article serves as an introduction to the general application of risk management as part of strategy formation. While risk can never be completely avoided, well-trained managers have many ways to take uncertainty into account in their strategy planning. Successful long-term planning includes the identification of risks, assessing their impact and immediacy and then controlling the risk. A particularly useful technique is to apply scenario analysis as part of strategic planning.

Uncertainty, Risk and Threats

Before introducing the ways companies deal with the uncertain future, it may be helpful to define some terms. *Uncertainty* is a lack of knowledge about the future. At the present time, we can only imagine the set of facts (what statisticians call “The True State of the World”) that will exist in the future. Uncertainty encompasses good as well as bad. For example, consumer rate of adoption of a new technology can exceed even the most optimistic forecasts.

In contrast, *Risk* refers to something that is invariably negative. It is the possibility of something bad happening in the future. For example, whenever a space shuttle is launched, there is a risk that it will not return to Earth safely. Following the notion that “risk” implies something bad happening (and not some happy surprise) managers use the terms *risk avoidance* and *risk management* with specific meanings. To continue the space shuttle example, abandoning the program and launching no space vehicles is effective risk-avoidance; developing fail-safe redundant control systems is a way to prudently manage the risks inherent in space travel.

Threats are risks that are dependent upon the behavior of others. For example, if a major competitor could possibly enter a market where our firm is happily making money, and such an entry would almost certainly reduce our profit, then this is a threat. Note that while the damage to profitability can be anticipated, the specific behavior of the competitor (entry or non-entry) cannot be predicted with certainty.

The process of risk management during strategy planning is outlined in Text Box 2. It begins with the process of identifying and assessing the things that can go wrong.

Risks Can be Identified and Assessed

In most business situations it is remarkably easy to identify the risks that a firm is facing. For any project, managers can identify risks by simply asking: “What can go wrong?” For example, if a product depends on components, the inability of a supplier to ship parts when needed is a risk that can be readily anticipated. Where a firm is attempting to develop a new technology, its research and development efforts will be successful in achieving desired performance—or not. Rainy weather in July delaying the start of the Wimbledon, UK tennis

championship is an adverse event that occurs so frequently it must be included in the schedule planning.

However, this is not to say that all risks can be foreseen. Defense Secretary Donald Rumsfeld famously observed that there are both *known unknowns* and *unknown unknowns*². What on earth did he mean? In a military situation, he meant that an army might know that its adversary had troops over the horizon, but not exactly how many (a “known unknown”).

**Text Box 2:
Techniques of Risk Management**

1. Risk identification
2. Risk assessment: Time horizon and impact
3. Risk tolerance and diversification
4. Risk avoidance and impact mitigation
5. Risk transfer
6. Scenario analysis and contingency planning
7. Regret analysis

And there might be some uncertainty as to whether the enemy had certain types of weapons (again, a “known unknown”). However, his dictum was meant to alert planners that, for all the variables that they could list and worry about, there would always be some others that could not have been anticipated (the “unknown unknowns”). It is hard to describe an “unknown unknown” in business, simply because it is unknown. However, an example would be something like the emergence of a completely new technology such as the advent of transistors in electronics. The efficiency and miniaturization offered by these solid state devices

could not have been predicted from the existing development work on thermionic valves.

How should business executives plan for the unknown unknown? At the extreme, the correct metric is to calculate the cost of project abandonment due to unforeseen circumstances. It is usually possible to imagine the effects of the unknown unknown even when a specific cause cannot be anticipated. For example, before 2001 the managers of the New York Stock Exchange would have had little reason to include the terrorist attacks in their strategy planning. However, they could reasonably plan for “something” (an unknown unknown) that would make it impossible to use their own trading floor—burst water-pipes, bomb threats and catastrophic fires in neighboring buildings were reasonably foreseeable as rare but possible events that would interrupt access to their building. Similarly, the criminal contamination of Tylenol capsules in 1982 was unprecedented, but the manufacturer Johnson & Johnson, could have considered strategies for some “unknown event” that would make the sale of the product temporarily impossible.

One useful source of ideas for things that can go wrong is “near misses.” For example, in the loss of the *Columbia* space shuttle in 2003, the vehicle broke apart on re-entry, a problem that had never been seen before. However, the cause of the disaster was damage to a heat shielding tile that in turn was the result of a strike by fuel tank insulation that had broken away during the launch. The loss of insulation had been observed before and was a matter of ongoing concern for NASA engineers. In the business realm, the hint of a near miss comes when a successful tactical maneuver is accompanied by exclamations of “We were lucky!” Business decisions that resulted in not-quite disasters may still be fruitful input for strategic planning. For example, suppose a firm runs an overly generous mail-in coupon rebate

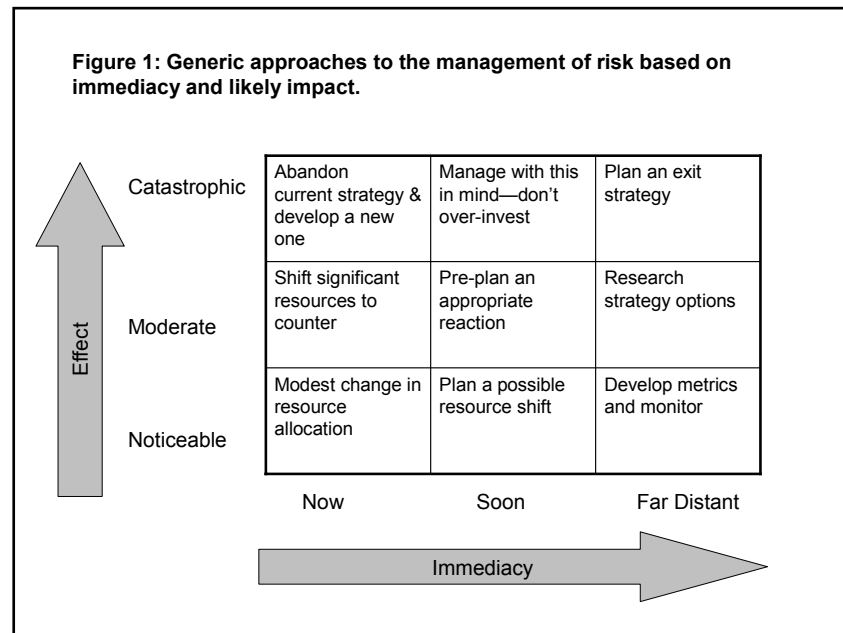
program but is saved from crippling expense by the lucky coincidence of a major storm that kept most shoppers out of the malls during the time of the promotion. This is a clue that in future the firm could face a predictable loss if rebate programs are not more carefully planned and control.

Although businesses face many different kinds of risk this does not make strategic planning impossible. There are several ways to take risks into account and to develop ways to manage them. The first step is to consider when trend shifts and adverse events might occur and then to make an assessment of the severity of the impact of these future states.

The Planning Horizon

Most readers will accept that the Earth is destined to crash into the Sun at some point in the future. However, since this event is hundreds of millions of years in the future, it's an event that shouldn't affect decision-making today. This rather absurd example shows that some uncertainties are so far off in the future as to be immaterial for all reasonable planning purposes. As the economist John Maynard Keynes famously said: "In the long run, we are all dead," an aphorism that was meant to refute the notion that economic slumps are naturally self-correcting if you just wait long enough. In strategic planning most firms ignore the far-distant future.

While time stretches out into the future in a continuum most firms assess uncertainties in three bundles: Immediate, Soon and Distant. The meaning of these terms depends upon the specific industry situation. For example, for an Emergency Room medical team, "Soon" can mean "within the next hour" and "Distant" could mean "tomorrow". In contrast, an oil drilling company could have a time horizon in which "Soon" means "five years" and "Distant" means within 25 years.



In the absence of any industry-specific reasons to take a short or long view, the conventional wisdom for the planning horizon would be that "Immediate" means "this month", "Soon" means "this year" (or within 12 months from now), and "Distant" means "possible within the next five years." In most businesses contexts the time period more than five years away is considered too far away to usefully predict.

Assessment of Impact

Whenever risks have been identified the impact of each risk can be assessed and assigned to one of three categories: Noticeable, Moderate and Severe. A less than “noticeable” impact is something such as the departure of a senior executive in a large company with a good succession plan—sales and profit should be unaffected. “Noticeable” events are things such as the market entry of a small competitor with an offering that appeals to a market niche; the competitor’s eventual entry has been predicted and as long as the competitor stays in its narrow market there is a measurable but small loss in sales that requires no particular response. Events that have moderate impact include the failure of a supplier in a market with many generic alternatives, or the entry of a competitor with equivalent technology. A catastrophic impact is something that makes the current strategy infeasible, such as the overturning of a patent or the emergence of a severe side effect to a drug, as happened to Merck with the Vioxx painkiller.

When the two dimensions of impact effect and immediacy have been added to a list of risks they can be organized in a matrix³ that gives general guidance for how to manage the risk, shown in Figure 1. Consider first the column of immediate impact events. Few firms have to face a catastrophic event with little warning. Terrorist attacks and the outbreak of civil war certainly count in this category, but thankfully are rare. In this situation, one could say that the answer is in the question as the correct managerial response is: “These events are so unprecedented and unforeseen that we must stop what we are doing and formulate a completely new strategy in light of the current situation.” Where there is a change in the environment that has an immediate impact that is moderate the prudent managerial course of action is to quickly shift additional resources to the current strategy. For example, when a major competitor enters a firm’s principal market, a substantial investment in promotional spending (and a new advertising approach emphasizing either a defensible core position or direct comparison) is warranted.

In the case of an immediate event that is assessed to have a merely noticeable impact firms should continue with the strategy already in place and make only moderate adjustments to strategy. For example suppose a niche-player enters a firm’s established market. The firm would continue the same level of promotional spending but might retrain salespeople with new talking points to specifically address the competition. The key to success here is in correctly assessing an impact as noticeable and not over-reacting. Temporary promotional pricing by close competitors is an example of such a situation that should not require a complete rethinking of strategy.

In the intermediate time horizon where the risk to the firm is not imminent, the key success factor is to anticipate the risks to current strategy then identify and monitor the relevant metrics. For example, it is often anticipated that a firm’s customers will migrate from one technology to another at some unknown point in the future. Prudent managers will handle this by surveying customer interest and monitoring pricing of the competitor technology. For example, for many years manufacturers of cathode ray tube computer monitors were well aware that flat panel displays would eventually take over their business. However, early

flat panels were very expensive. There was no way to predict whether the change-over would be sudden (as happened with adoption of home use of the Internet) or would occur only as consumers replaced their computers (about once every three or four years). As long as careful observation is in place and managers are not complacent a firm can take some time to develop alternate strategies.

Where the intermediate future includes some possibly catastrophic events managers should test strategies against the cost of project abandonment. For example, in the tourism and hospitality industry, avian influenza or other contagious diseases might close down all intercontinental travel for a period of time. The prudent course in the face of such a risk is to avoid over-investment that would “bet the company” on one project.

When threats are far distant the best approach for a firm is to have a comprehensive view of strategy planning and to fully explore all the options that are open to it in the future. This is especially true in the middle case where perceived adverse events are likely to have a moderate impact on the company’s operations. Where the impact will be catastrophic, the firm should have an exit strategy in mind. Often this will simply be the abandonment of a specific market with investment to date treated as a sunk cost. For far distant threats that are likely to have only a minimal impact on the firm, identification of the relevant metrics such as market share or consumer sentiment and regular monitoring are all that is required.

With risks identified and categorized we can turn to the techniques that firms can use to manage risk.

Risk Tolerance and Diversification

All firms (and their management teams) have a certain tolerance for risk, usually tied to the company’s age, with young companies often be willing to bet their entire net worth on a single strategy while more mature firms may become positively risk averse. However, between these two extremes, many firms actively manage their exposure to risk by a “portfolio” approach. It is well known that in the financial markets investors demand a greater potential return for taking on a greater risk. For example, firms that have an uncertain future must offer an above average interest rate in order to sell bonds. Investors are familiar with the portfolio approach to investing. Under this method, investors tolerate owning risky instruments by only putting a portion of their net worth in each one. A well balanced portfolio is one with investments in many different industries so that an adverse event that affects one investment will not impact the others.

Firms use the same portfolio approach to projects, especially those associated with new product development. A simple product modification to adapt a product to an existing market is low risk, whereas entering a new industry with no developed market is very high risk. Under a portfolio approach, the firm does not completely avoid high risk projects but limits the number of high risk projects that will be undertaken simultaneously and balances them with some low-risk/moderate-reward projects. For example, a firm with too many high risk projects might license out some patents to other firms to avoid the expenses and risks of new product introduction for some lines of business, while concentrating on the in-house launch of other ideas.

A further example of where diversification can limit risk is in firms' geographic distribution. While the leading corporations of the nineteenth century favored massive headquarters buildings where most of their corporate functions were located (the Woolworth Building and the old Pan Am building in New York City are examples) most modern corporations not only locate their most important functions away from city centers, but also have their offices broken up into a number of smaller buildings. Even Sears moved out of its eponymous tower in Chicago in 1992. Some redundancy of functions has been much easier to accomplish with lower technology costs and software that replicates data to multiple servers. Geographic distribution protects firms from catastrophic business interruption due to an adverse event at a single site.

Risk Avoidance and Impact Mitigation

One of the simplest and most appealing strategy options is simply to avoid risk. For example, people who never go sky diving won't have to deal with the small chance of a catastrophic parachute failure. Of course, a strategy to avoid all risk is hardly practical for commercial enterprises. Firms that attempt to avoid all risky endeavors are likely to be overtaken by competitors and will eventually see their market share dwindle to extinction.

However, once risks have been identified firms can work to reduce the probability of occurrence. For example, retail stores are at risk of consumer claims for "slip and fall" accidents. With this identified, most stores will have a plan in place to mop up spills and mark hazards. Similarly, in the risky situation of new product introduction, firms that use extensive test marketing *and* are prepared to engage in product redesign as a result of test market experience face fewer risks than those which rush to market.

Risk Transfer

When risks can be clearly identified, one way to obviate risk is to transfer it to another entity. For example, almost all homeowners transfer the risk of loss of their house by fire to an insurance company. Similarly, commodity producers can transfer the risk of price declines by trading in the futures markets to lock in a price and commodity users can avoid price shocks by purchasing future contracts. Southwest Airlines⁴ used this technique to avoid a rise in jet fuel prices in 2005. Firms whose strategies are impacted by foreign currency exchange variations can reduce their risk by hedging transactions.

Changes in ownership structure can also reduce risk. For example, a company that sells its headquarters building to a real estate investor and then leases back the building transfers the risk of future value of the building to the investor. Taking on a joint venture partner can reduce a firm's capital exposure to a risky new market. For example LG.Philips LCD, is a joint venture between South Korea's LG Electronics Inc. and Royal Philips Electronics NV of the Netherlands. It spreads the risk of loss from the massive investment needed to set up a flat-panel TV manufacturing facility, when consumer adoption of the new technology was unknown.

So why don't firms simply transfer away all their risk? First, there is no insurance or hedging that will protect against what is called "ordinary business risk" such as the risk that consumers won't like a new product or a supplier will be unable to increase production volume to match demand. Second, all insurance comes at a price. When Southwest hedged its fuel costs, JetBlue an airline with a similar business model, guessed that fuel prices would decline and decided not to purchase future contracts⁵. The firm that engages in sale and lease back gives up the possibility of a capital return on the asset and a firm that engages in a joint venture gives up part of future profits. In sum, risk transfer is never costless.

Scenario Analysis

In his seminal text *Competitive Strategy* Michael Porter⁶ wrote that, "The device of scenarios is a particularly useful tool in emerging industries. Scenarios are discrete, internally consistent views of how the world will look in the future." Scenario planning can be contrasted with forecasting. In forecasting careful analysis of historic data is used to offer a precise estimate of a parameter in the future, such as the specific level of demand for a firm's product. Unfortunately, precise numeric estimates often give a false sense of certainty of what the future will be like. For example, the worldwide demand for domestic use DVD recorders in 2005 was estimated at 47 million units, but in fact only about three million were sold⁷. The difficulty of extending trends into the future can also be illustrated with the example of the market opportunity that has opened up due to the increasing number of Americans who are obese. Furniture manufacturers and hospital equipment suppliers have adapted designs that accommodate people of high body weight. But will the trend continue? From 1980 to 2006 the number of obese Americans rose from 23 million to 60 million people⁸—does that mean that we can expect an additional 37 million obese customers in the next 26 years, or will the trend reverse itself due to cultural shifts or new treatments for obesity?

Scenario planning acknowledges that the future is uncertain and that many different fact situations may exist in the future⁹. Consider the situation faced by Microsoft in the marketing of its word processing software, MS-Word at the beginning of the 1990s. At the time, WordPerfect had a market share of more than 85 percent and appeared to have such a dominant position in terms of its installed base of users that the success of any later entrant seemed unlikely. Although the Windows graphical interface personal computers had been introduced, many home and small office users were still using the text-based MS-DOS operating system because changing to Windows needed a newer computer with more memory in most cases. The advantage of MS-Word was a "WYSWYG" (what you see is what you get) screen display, whereas WordPerfect showed a marked up text draft that printed in a somewhat different format than the user saw on the screen.

Looking at an uncertain future, Microsoft had to take into account the following variables:

- Users' rate of adoption of the Windows operating system
- How quickly WordPerfect would develop a WYSYG interface
- Users' willingness to switch from other word processing programs to MS-Word
- The possible market entry of other word processing programs

While at first glance this suggests a myriad of possible futures for Microsoft to encounter by, say, the year 2000, applying Porter's dictum that scenarios have to be internally consistent, the fact situation was limited. For example, a future in which MS-Word achieved market dominance but in which users avoided the Windows operating system seemed unlikely.

The process of constructing scenarios (summarized in Text Box 3) is fairly simple¹⁰. First, identify the relevant variables and then identify whether they are discrete or continuous. In the MS-Word example, at a given point in the future, credible competitor programs to MS-Word and WordPerfect would or would-not exist (a discrete variable). User adoption of Windows is a continuous variable. Continuous variables need not lead to an overwhelming number of possible scenarios. Instead, continuous variables are constrained to high, medium and low values. For example, users' willingness to switch word processing programs could be estimated as "many switchers", "moderate switching", and "great reluctance to switch."

<p>Text Box 3: Steps in Scenario Planning</p> <ol style="list-style-type: none">1. List the critical variables2. Constrain continuous variables into low, medium and high values3. Combine variables and eliminate implausible groupings4. Give easy-to-remember names to each scenario5. Estimate the likelihood of each scenario6. Develop a concise but exhaustive list of possible strategies7. Assess the likely payoff for each strategy against each scenario8. Develop an algorithm to choose such as minimum acceptable payoff, maximum tolerable loss
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The next step in scenario analysis is to gather the variables together to make specific "scenarios". Remember that Porter said that scenarios must be discrete and internally consistent. That means that one scenario cannot overlap another and ideally all possible futures can be described within the list of scenarios. The requirement for internal consistency may eliminate some scenarios entirely. For example, if the economy is in deep recession, it's unlikely that consumer spending will be high. In the MS-Word example, there is no plausible future in which computer users are reluctant to shift programs and there is also the emergence of very many competitor programs to MS-Word and WordPerfect. Similarly, if the adoption of Windows was rapid *and* WordPerfect was slow to develop a WYSIWYG interface, users willingness to switch to MS-Word would most-likely be high.

Planners then give the relatively small group of imagined futures distinct informal names. In this example, the futures might have labels such as: "We rule the world," (for rapid adoption of Windows, few competitor entrants and a slow response by WordPerfect) "Battling for market share" (splitting the market with WordPerfect) "Chaos" (very many programs, each with minuscule market share) and "Another failed launch" (continued dominance by WordPerfect). For example, Randall and Goldhammer¹¹ developed four possible scenarios for China as an economic power with just two variables resulting in four scenarios. In the first variable, the consider whether China's economy continues to grow at a high steady pace on the one hand, or whether environmental and social issues serve to reduce the growth rate. The second dimension concerns China's relationships with other countries, whether it resolved all trans-national disputes diplomatically or if it increases military spending and

seeks super power status. The point of this example is that by constraining two dimensions to just their high and low values, a small number of futures—four—is all that needs to be considered for planning purposes.

Coming up with a manageable, discreet set of scenarios is not as difficult as it sounds, because of likely links between variables. Consider the situation faced by film maker Kodak¹² in the early 1990s. Effective digital camera technology had just been announced and the uncertain future contained these possibilities: (a) Digital cameras remain expensive and only achieve adoption in professional markets; (b) over a long time period, digital cameras are adopted by professionals and small number of “serious amateurs”, and the price of components remains high; (c) digital cameras move to the mainstream over several decades (similar to the adoption of automatic transmission in US cars from 1940 to 1960) and prices of components gradually fall; (d) “Grandma goes digital”: fast and broad adoption of the digital format accompanied by a sharp decrease in use of film cameras and a lowering in component costs for digital cameras. Note that while the cost of components for cameras was uncertain fifteen years ago, it was reasonably predictable that if mass-market adoption occurred would come hand-in-hand with manufacturing inefficiencies resulting in lower prices. As a result the possibility: “Everyone wants one and the prices go sky high” is not in the set of likely scenarios.

Once the scenarios have been identified and labeled, it is prudent to make an estimate of the likelihood of each one. This is fairly easy to do using common sense. In the case of discrete variables, if there is no credible external information, each outcome is equally likely. For example, the chance that a competitor will or will not decide to offer a product in a particular category should be estimated at 50 percent. However, if the competitor has signaled intentions (“We find Asian markets particularly attractive for future growth,”) then the probability of market entry could be estimated higher, say 80 percent. For continuous variables, such as growth of the economy planners can use intuition or the average value of published experts’ opinions. Individual expert’s opinions are often wrong, and “consensus” of experts who listen to each others forecasts are not particularly reliable¹³. For instance, political pundits were shocked that Bill Clinton not only was unable to pass health care reform in his first year in office, but also achieved no material change in the US healthcare system during eight years in office. However, the mid-point of experts estimates such as predictions of economic growth (like those published by the Economist magazine) tend to be surprisingly accurate¹⁴.

Fortunately, if scenario planning is done correctly, estimating which scenario is most likely is the least important part of the process. Rather, managers try to choose a strategy that is beneficial no matter what scenario plays out.

Just as scenarios—the truth that the future holds—should be a reasonably complete but small set, planners should also develop a manageable set of possible strategies. The goal is to be exhaustive (consider all possibilities) but not exhausting (so many variants that it is impossible to choose between them). Of course, “do nothing” and “withdraw from this line of business” are options that should always be included. Strategy choices include the selection of target market and then the crafting of a Marketing Mix (product choices, price, distribution and promotion) that will appeal to the target. For example, in the MS-Word case, Microsoft could have given away a limit-feature version of its program to induce trial,

or could've decided to leave the broad home-user market to WordPerfect and concentrate instead on a very high priced specialized version of MS-Word targeted specifically to the legal market.

The next step is to test each possible strategy against the possible future scenarios and estimate the payoff. In some cases this will be a sophisticated net present value of multi-year investments and returns. However, quite useful scenario planning can be accomplished by a simple rating of + and - signs where "four minus" is extremely bad, and "four plus" is a highly advantageous outcome.

At this point planners will need to apply an algorithm to determine which strategy to adopt. There can be no universal algorithm as some firms have a greater ability to bear a loss from a failed strategy than others. For example, a firm may have a rule that it wants to embark on no venture for which more than \$100 million is at stake. This would lead to an algorithm

Figure 2. Estimated Payoff Matrix

		<i>Potential Strategies</i>			
		1	2	3	4
Scenario A	++	+	+	--	
Scenario B	--	++++	++	--	
Scenario C	--	----	++	+	

that paid greater attention to potential loss than to the chance of a decent profit.

The preferred strategy is unlikely to be the one that gives the single best possible result because the best possible result may only occur under one lucky scenario while the payoff under all other scenarios is decidedly negative. Quite often the preferred strategy will be one which gives a pretty good payoff under many scenarios, but not necessarily the

maximum possible payoff. This is a tradeoff that is accepted to avoid some severely negative outcomes.

For example, Figure 2 presents a hypothetical payoff matrix in which the single best payoff comes if Strategy 2 is adopted and Scenario B unfolds. But a firm that is intolerant of losses would choose Strategy 3. While none of the expected payoffs is as good as the Strategy 2 most-lucky Scenario combination, a loss is avoided under all probable futures.

Where two strategies compete in terms of expected payoff, the likelihood of scenarios can be taken into account. The firm should choose the strategy that gives the best payoff under the most-likely scenario. However, it is very important to avoid the temptation to believe that one scenario is "bound to happen" when the payoffs are tempting. As the quotation attributed to General George Custer has it: "Hope is not a strategy." That is, just because one outcome is attractive, planners should not hope that it will be true, or much worse assert that the future is almost certainly going to be one way or the other. The whole point about the uncertain future is that it is, indeed, uncertain. "Hope" can be detected in strategy meetings when participants begin to assert a single view of the future, such as "Most DSL users are going to switch to cable." For example, consider a planning exercise for the launch

of a new pharmaceutical which looks likely to be first to market in a competitive situation where peer companies are developing similar drugs. One uncertainty is the speed of FDA (Food and Drug Administration) approval. With luck the drug trials go well and there are no bureaucratic delays at the FDA. The payoff is wonderful: Our firm is first to market and achieved early brand name recognition and a dominant market share. Competitors who enter later can be positioned as “me too” products with no proven advantage over the incumbent. Indeed, this scenario is so good that it soon leads from “hope” (“we are pretty confident that we’re going to get early FDA approval) to hubris: “We’re going to get early approval.” Managers must be aware of this temptation and be prepared to throw a cold bucket of reality on risks that are beyond the control of the firm. In this case, by asking, “Well, of course, that would be wonderful if it happens. But take me through here, where are we at if we end up with a 6 month delay? How would that change our thinking?”

In financial risk analysis, computer modeling (Monte Carlo simulation) is popular; in this technique very many “runs” of a model are conducted with parameter values chosen at random and the results are expressed as a summary of the outcome of each of the runs. For example, if a saver puts a fixed sum away every year and invests it in the stock market, the returns from those investments vary from year to year. In any particular year the saver will be rewarded with a particular rate of return, not the average rate of return. The simulation is programmed to pull a rate of return for each year in the future at random from previously observed market performance; the result is expressed as: “You would have a 95 percent chance of being able to retire at your current income level by age 60.” While Monte Carlo models are very useful in financial risk management they are likely to be overly complicated in most business strategy decisions and likely to give a false sense of precision because the future cannot be foretold. For example, a time series of historical oil prices would not necessarily be very useful for predicting the future.

One final technique, *regret analysis*, is essentially a re-check of the attractiveness of the chosen strategy.

Regret Analysis

When a viable strategy has emerged it should be considered a “candidate” for the firm’s planning and managers should conduct one last survey of the options that have been eliminated and reassess them to evaluate “regret”. *Regret analysis* is a form of protection against biases that tend to creep in when planners begin to believe with certainty the likelihood of one scenario. Consider again the hypothetical example shown in Figure 2. Many companies would choose Strategy 3 that gives a “pretty good” payoff in all three scenarios. But the regret analysis draws attention to the excellent payoff for Strategy 2 *if* Scenario B plays out. (Note that Strategy 2 leads to a large loss if in fact Scenario C comes to pass.) A firm would choose between Strategies 2 and 3 based on its ability to bear a large loss (probably the complete write off of a project plus some exit costs) and a dispassionate assessment of whether Scenario B or Scenario C is most likely. If the firm cannot bear the loss anticipated with the 2 – C combination, it will live with a modest level of regret if Scenario B is in fact true.

As an example of regret analysis, imagine a company that is considering selling software in

the People's Republic of China (PRC). A major unknown about the future is whether the PRC government will strictly enforce intellectual property protection. A reasonable extrapolation from historic experience is that despite top government commitment to enforcement, there is still rampant piracy of computer software (more than 96 percent of programs in use have been pirated). A thorough scenario analysis suggests that no strategy for market entry (high price, high price and economy versions, economy version only) can lead to any reasonable payoff for the foreseeable future. However, what does regret analysis tell us? One scenario, though extremely unlikely, is that the future includes a fail-safe method to prevent the copying of software. Competitors who entered early have achieved brand recognition and our firm's belated entry would be shut out of an emerging profitable market. The level of regret would be high. After the regret analysis the firm takes another look at the market entry strategies, and chooses the one with the best chance of establishing a recognized brand, albeit at little immediate incremental profit.

Facing Up to Risk

Effective decision making depends on managers clearly understanding what the firm can control (its own strategy decisions) and what factors are beyond its control (the uncertainties held by the future). The systematic identification and assessment of risk, a frank discussion of risk tolerance and the use of a variety of techniques to mitigate risk will lead to good strategic planning.

¹ Baby boom and bust, *The Economist*, 12 May 2006, p. 88

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³ Aaker, D. *Strategic Market Management*, New York, Wiley, 2005, p. 108

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