



# StratLab™

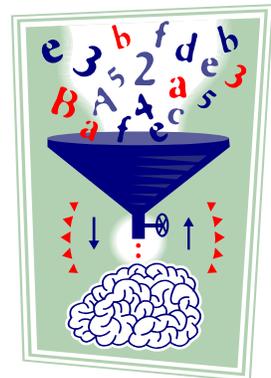
## A New Scenario Planning Tool for Managing Business Strategy Risk

by Gerard Badler and Joaquim Branco

**MANTIS** • Empirimetrics

## Summary

Insurance, hedging and financial derivatives enable CFOs to better manage hazard risks (natural disasters, lawsuits) and financial risks (interest rate and commodity price fluctuations). But for most corporations these shocks pale in comparison to the potential stock price damage associated with business strategy risks. We refer to those fuzzy uncertainties associated with competitors' moves, macroeconomic conditions, and deregulation -- for which traditional risk management techniques are inappropriate.



StratLab™ is an advanced, cost-effective technology for describing, quantifying *and* developing responses to business strategy risks.

StratLab achieves its believability by combining three disciplines effectively used in other arenas: (a) computer simulation (b) genetic algorithms for finding optimal solutions and (c) cross-sectional research on the consequences of business strategies.

## StratLab advises those who ask “What if?”

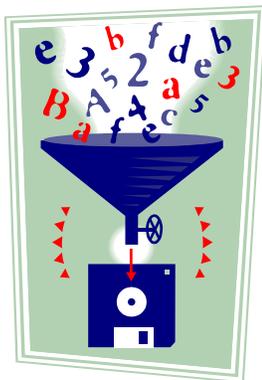
### Introduction

Investors, employees, Board members, and regulators are stridently demanding more comprehensive and reliable risk assessments from corporate managers. Until recently, however, the technology for doing that effectively lagged far behind demand.

The major hurdle: How do you measure and prepare for the major uncertainties that determine your company’s stock price —business strategy risks?

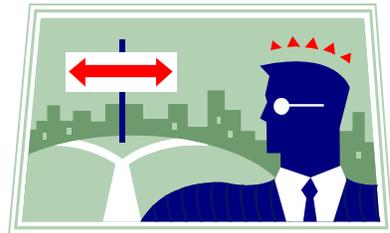
Strategy risk stems from rapid, unexpected change. It is often unleashed by technological innovation, deteriorating macro-economic conditions, deregulation, industry consolidation, or competitors’ moves. Unlike hazard and credit risks, these usually cannot be covered by insurance or hedging activities.

A study by Mercer Management Consulting reports “Over the five-year period that ended last May [1998], 10 percent of Fortune 1000 companies lost, at least once, one-quarter of their shareholder value within a one-month period. ... the stock drops were almost all triggered by reduced quarterly earnings or reduced expected future earnings. And the majority – 58 percent – of these earnings shortfalls were caused by strategic risk factors, such as a drop in customer demand, channels misaligned with customer priorities, or increased competitive pressure. Thirty-one percent were the result of operational risk, and six percent were the result of financial risk. Interestingly, traditional hazard risk triggered none of the stock price drops.”<sup>1</sup>



StratLab is a major step forward in the field of Enterprise Risk Management. It is a reliable, cost-effective tool that fosters preparedness by:

- Quantifying the effect of a wide spectrum of high and low probability shocks. It thereby identifies, from a mass of conflicting, ambiguous possible futures, which are worth worrying about as significant threats or opportunities. It employs a standardized high-level language to structure the task and to facilitate risk comparisons and correlations across businesses.
- Proposing pre-emptive counter-measures, by identifying actions you can implement *before-the-fact*. These enable you to minimize the likelihood of a shock (risk prevention), or minimize its impact once it unfolds. [Example: StratLab might identify a price war as the most severe shock to your business and suggest an immediate improvement in your product quality as the best way to insulate you from having to match competitors' price cuts.]



## StratLab integrates risk management and strategic planning.

- Proposing counter-measures you should implement *once the threat unfolds*. [Example: if a price war breaks out, how should the previously mentioned quality move be augmented by changes in your marketing expenditures, pricing, staffing and market share targets?]

### A cutting-edge, well-tested approach.

StratLab has been used successfully by major organizations (including Dell, Coca-Cola, Ernst & Young, Digital, IBM, Compaq, Baxter, Verizon, Yale New Haven Medical Center, Perclose, and AMP). Our approach builds on earlier work by the principals

when they managed The PIMS™ Program. The program originated at General Electric and later expanded at the Harvard Business School. Over two decades PIMS studied more than 3,000 businesses owned by over 300 major corporations (such as GE, Hewlett Packard, Westinghouse, Exxon, Chase Manhattan, and United Technologies) in a wide variety of industries worldwide.

StratLab works by incorporating three analytical approaches widely employed in other fields.

- Computer simulation.
- Genetic algorithms for finding an optimal solution.
- Cross-sectional empirical research.

Let's briefly review each one and then show an example of their application to the risk analysis of one business.

## Computer simulation pierces the fog of the marketplace.

StratLab's simulation employs a high-level language to streamline the task of describing:

- Your proposed strategy. These are the variables you can control.
- A scenario you might face. The scenario consists of variables you do not control. These include competitors' strategies, customers' preferences and investors' requirements.

Once you describe your strategy and scenario, the simulation engine projects how each player will likely evolve, quarter-by-quarter, over the next five years. It generates various financial

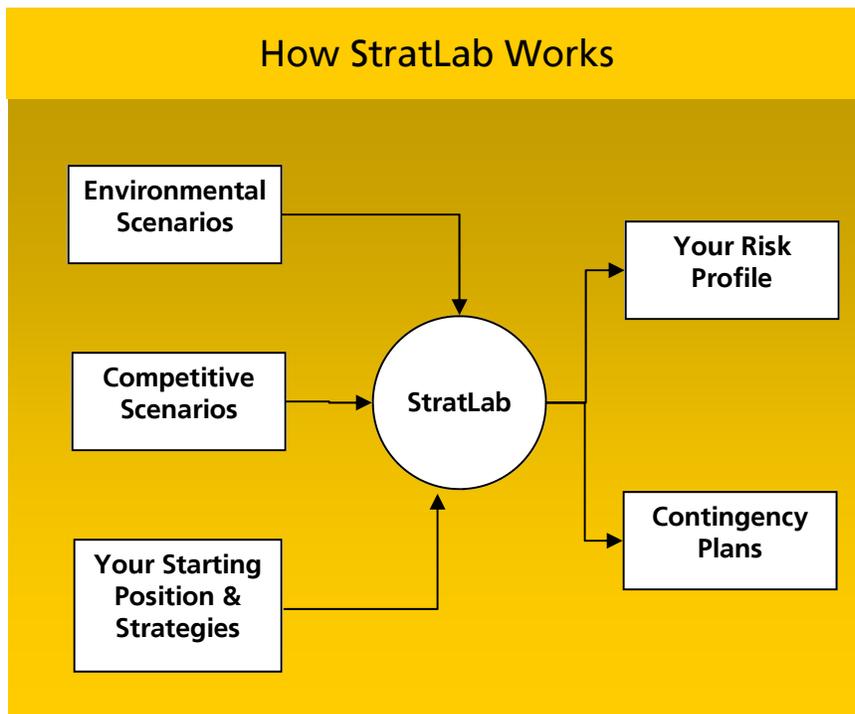


Exhibit 1

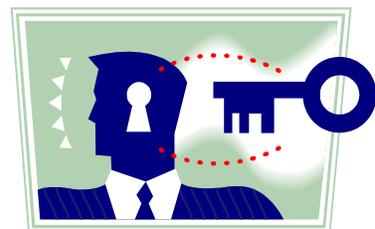
performance measures for your business and for your competitors. The process takes but a few minutes, encouraging a “let’s try it and see what happens” approach to planning. The benefit: rapid learning about what is likely to work, and what will not—and why.

## The process promotes rapid learning about competitive interplay.

### **Genetic algorithm helps discover superior strategies.**

One of StratLab’s most valuable features is a proprietary piece of software that “discovers” coping strategies to help you deal with potential crises. The technique is a genetic algorithm (GA).

How does it work? As a starting point, StratLab’s GA develops a population of randomly-generated strategies. The financial performance of each is evaluated (using the approach described in the next section). Next, the better strategies are recombined with each other to form some new solutions. Finally, the new solutions are used to replace the poorer of the original solutions and the process is repeated. Through the processes of breeding, mutation, and natural selection, better and better strategies gradually evolve.



Amazingly simple as StratLab’s GA is in principle, it has successfully developed novel solutions to some extremely complex problems. One of North America’s largest energy companies used StratLab’s GA to “discover” two radically different, but very profitable marketing approaches for participating in deregulated retail electricity markets (if and when that occurs).

The strategies nominated by the GA improve financial returns for most users by at least 30-50% above those projected for their initial business plan.

### **Cross-sectional empirical research enables you to learn from other firms' experiences.**

StratLab has embedded within it the experiences of thousands of real-life businesses, operating under a wide variety of circumstances. So, even though your business may confront a situation new to it, the model can apply the experiences of other businesses with a profile similar to yours that have faced something similar.



For example, say that your largest competitor has installed new, capital-intensive, cost-reducing production technology. You are wondering whether to follow suit. You have a weak market share and sell a commodity-type chemical product, in a market growing two percent per year. What would be the effect of such a move on your return on investment and cash flow?

Extensive research indicates that you can get a more accurate answer by examining the effects of capital intensification on businesses *outside* your industry rather than on those within your industry. One reason: **your competitors don't have your strategic position. What works for dominant competitors usually doesn't work for weaker rivals.** The right approach: search for businesses with market positions similar to yours that have already made the move you are contemplating, in other slow-growing, commodity industries. What happened to them is a pretty good predictor of what will happen to you.

Incidentally, for this example, the move is usually contraindicated. By raising fixed costs you and your competitors will become more anxious about capacity utilization. Therefore,

you will more likely engage in profit-destroying price or other types of marketing wars. The usual pattern is that you give up all, if not more, of the cost reductions in the form of price reductions.

### **StratLab assesses your business' strategy risk.**

StratLab investigates how your strategic position and financial results will change if your assumptions about competitors, customers, suppliers or the economy (real activity, money supply, etc) prove wrong. The benefit: You focus on monitoring the things that really matter.

## StratLab nominates contingency plans.

The simulation can model and evaluate risks that:

- You specify.
- The model considers worth exploring, even (or especially) if currently overlooked by management.

The model does not require that you specify exactly what will cause a shock or that you specify its probability of occurrence. You can explore an almost limitless range of threats (and opportunities).

Take the case of the Firestone/Ford tire fiasco. To assess that type of risk, StratLab need not know the specific technical problem involved; it requires only that management envision a sudden, severe drop in the firm's quality reputation. StratLab will then estimate the financial and strategic consequences of that threat by examining what happened to other businesses, with similar starting positions, that experienced a similar disastrous quality decline. [It does not rely on finding other tire makers who experienced problems with their products.]

Another example: it would not be necessary for an airline to predict the events of September 11 in order to examine the effect of a prolonged, deep downturn in passenger demand. All that is required is the ability to envision that such a downturn might occur, for whatever reason. And you can vary the intensity of the downturn and see how that changes the model's forecast of your financial performance.

Exhibit 2 lists the risk scenarios we examined for one business.

Scenarios	
Scenario #	Description
1	Base (or momentum). Competitor starting positions, expected competitor behaviors, and macro-economic environment.
2/3	Market growth is slower/faster than Base.
4/5	Inflation rate is slower/faster than Base.
6/7	Interest rates are lower/higher than Base.
8/9/10	Competitor A/B/C attempts to gain share by reducing prices.
11/12/13	Competitor A/B/C introduces a marketing campaign that successfully increases perceived quality.
14/15/16	Competitor A/B/C increases capacity and reduces price.
17/18/19	Competitor A/B/C preemptively adopts cost-reduction technology.
20/21/22	Competitor A/B/C emphasizes quality-improving technological change.
23/24/25	Competitor A/B/C aggressively emphasizes new-product introductions.
26	A long-term price war erupts among our competitors.
27	Competitors B and C merge.
28	All competitors adopt aggressive <b>share-gaining</b> strategies.
29	All competitors adopt aggressive <b>cash-generating</b> strategies.

Exhibit 2

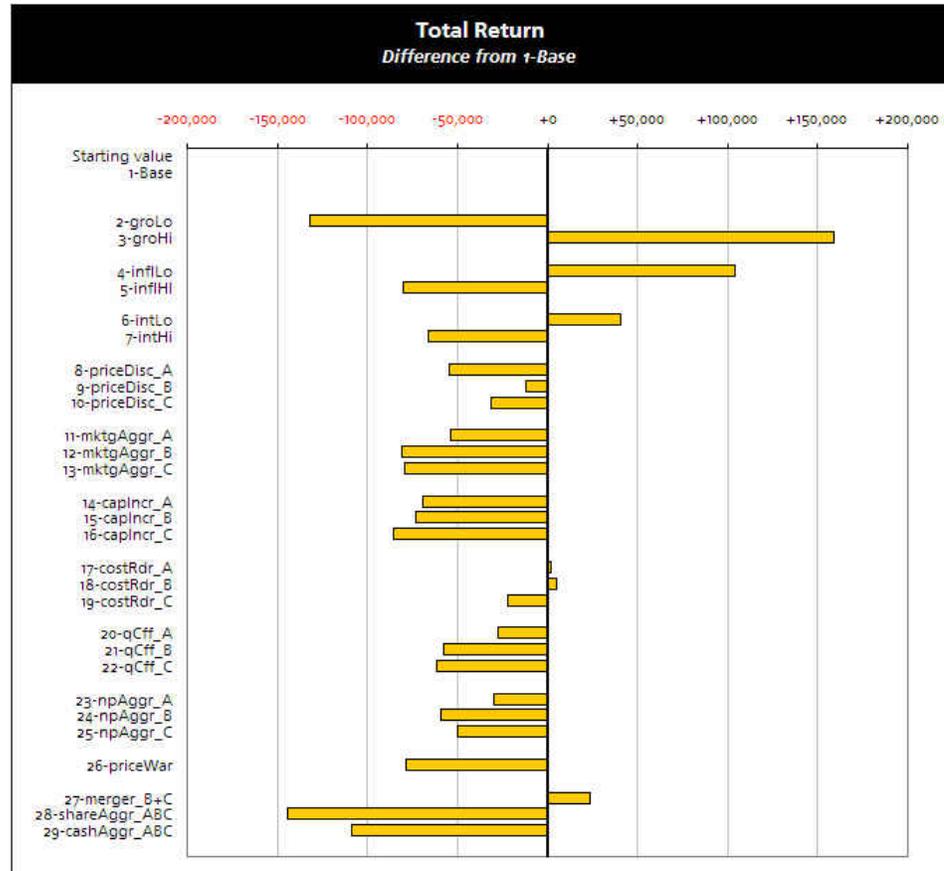


Exhibit 3

Exhibit 3 lays out the risk profile for one business. The effect of each risk on financial performance is quantified as A minus B, where:

A = Total Return if the specific risk (scenario) unfolds and we follow our Base strategy.

B = Total Return if the Base scenario occurs and we follow our Base strategy.

Total Return is five-year discounted net cash flow plus the increase in capital value of the business by year five, discounted. The capital value is an estimate of the stock market value of the business, based on empirical research on the determinants of stock prices.

The impact of each shock is measured by how much it will add to, or detract from the Total Return the business is likely to achieve if none of the shocks occur and the business follows its Base strategy.

The performance measure used here is Total Return, but you could plot other success measures (for example, earnings growth, market share, or cash flow).

For the business in **Exhibit 3** we plotted the impact on Total Return of each of 29 shocks. Among the more damaging are shocks 11, 12 and 13. These represent an abnormally aggressive marketing effort by competitor A, B or C, respectively, that succeeds in raising the competitor's quality reputation.



The most damaging scenario, 28, occurs when all three competitors pursue all-out strategies to maximize their market shares.

Somewhat surprisingly, the simulated merger of the two smallest competitors, B and C, is not expected to have a significant impact on our example business. [The reasons are illuminated by StratLab's output, but are beyond the scope of the paper.]

Less surprisingly, the shocks representing unexpected high market growth, low inflation or low interest rates all provide attractive opportunities.

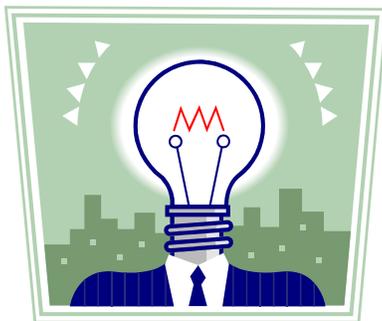
### **StratLab develops contingency plans to cope with your risks.**

StratLab generates back-up strategies and tactics for each significant potential threat or opportunity, so that you are able to react more quickly and intelligently before, and when, an event occurs in the marketplace.

The model uses a genetic algorithm to uncover your most promising actions among thousands of possible combinations. The process, repeated for each risk, is as follows. You specify:

- The success measure you wish to optimize (for example, Total Return, discounted net cash flow, earnings growth, market share, etc.).
- The constraints on your actions, such as cash limitations and maximum workforce reductions.
- The specific risk you are managing (for example, a market downturn, a competitor's expansion move, another competitor's financial collapse).
- The model randomly generates a large number of possible strategies for your business, and projects the consequences of each. It selects the most successful of these possible strategies for further improvement.
- The genetic algorithm then "cross-breeds" the most successful strategies, by a process that mimics how evolution occurs in nature, creating additional possible strategies for your business. This process is repeated until no further improvement occurs.
- You then explore the best nominations made by the model, to find the one that makes most sense to your management team.

Working with StratLab is usually an iterative process. The first genetic algorithm (GA) runs often discover strategies far removed from those the management team is considering. For a recent client selling a commodity product it suggested de-commoditizing—employing a Coca Cola or P&G-type branding strategy. While intrigued, the team decided that the level of differentiation recommended (to be achieved by a combination of advertising and new service features) and the price premium advised were not achievable in their market. They then reran the GA, constraining the level of differentiation possible, and generated an attractive strategy more appropriate to their situation.



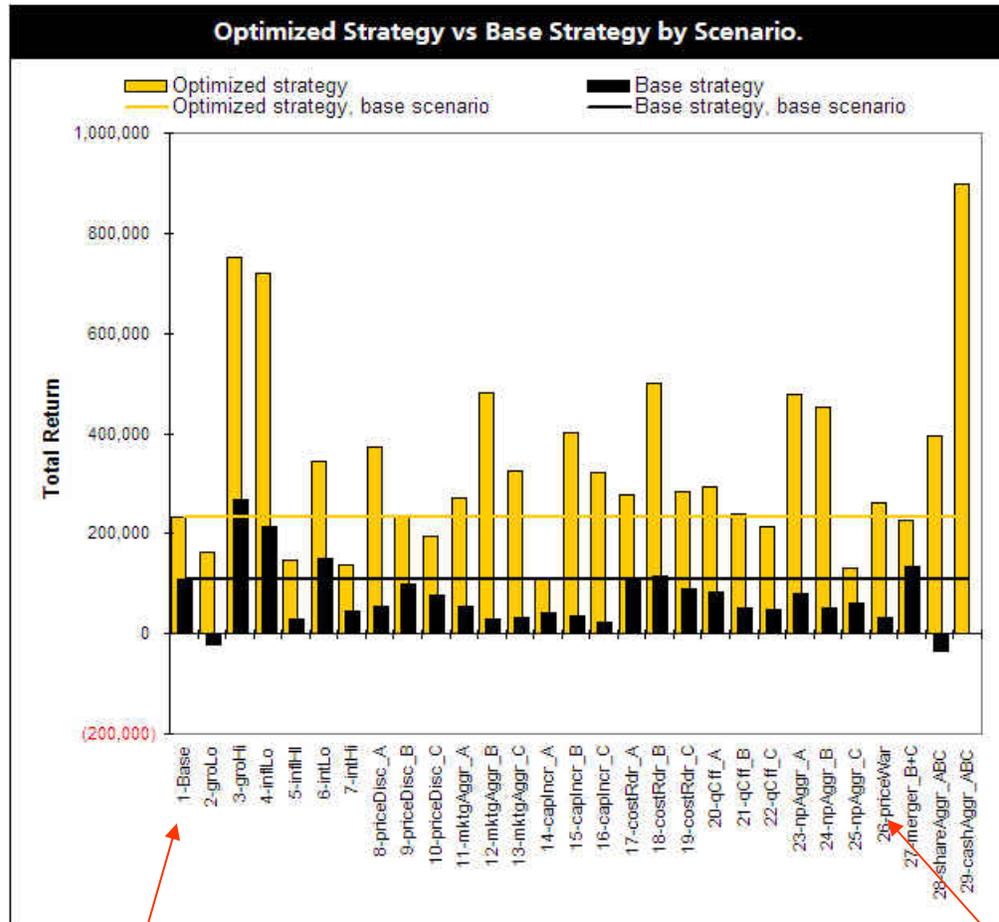


Exhibit 4

Exhibit 4 shows the Total Return achieved by the GA for each of 29 scenarios, and compares that to the level predicted if the business were to follow the path described in its Base business plan. Invariably the GA finds a higher value strategy.

The optimal strategy recommended for the Base scenario has a value of about \$230 million, more than double the value of the Base strategy (as indicated by the two left most vertical bars in Exhibit 4).

In the Price War scenario (#26), the Base strategy will likely yield a Total Return of about \$30 million. But the GA discovered another strategy for that scenario likely to generate about \$260 million.

How to Cope with Risk						
			Share	Quality	RP	Mktg/M
			0.175			
			<input checked="" type="radio"/> Optimized <input type="radio"/> nonOptimized			
#	Shock	Total Return	Share	Quality	RP	Mktg/M
1	1-Base (gaTR)	233,558				
2	2-groLo (gaTR)	162,288				
3	3-groHi (gaTR)	753,199				
4	4-inflLo (gaTR)	720,573				
5	5-inflHi (gaTR)	146,501				
6	6-intLo (gaTR)	343,630				
7	7-intHi (gaTR)	138,432				
8	8-priceDisc_A (gaTR)	371,857				
9	9-priceDisc_B (gaTR)	232,916				
10	10-priceDisc_C (gaTR)	194,450				
11	11-mktgAggr_A (gaTR)	271,199				
12	12-mktgAggr_B (gaTR)	480,375				
13	13-mktgAggr_C (gaTR)	326,746				
14	14-capIncr_A (gaTR)	113,162				
15	15-capIncr_B (gaTR)	400,846				
16	16-capIncr_C (gaTR)	321,183				
17	17-costRdr_A (gaTR)	278,106				
18	18-costRdr_B (gaTR)	500,722				
19	19-costRdr_C (gaTR)	283,366				
20	20-qCff_A (gaTR)	291,845				
21	21-qCff_B (gaTR)	238,060				
22	22-qCff_C (gaTR)	215,140				
23	23-npAggr_A (gaTR)	476,768				
24	24-npAggr_B (gaTR)	451,853				
25	25-npAggr_C (gaTR)	131,830				
26	26-priceWar (gaTR)	262,504				
27	27-merger_B+C (gaTR)	225,221				
28	28-shareAggr_ABC (gaTR)	393,700				
29	29-cashAggr_ABC (gaTR)	897,786				

Exhibit 5

**Exhibit 5** summarizes the GA's nominated strategies for coping with each future envisioned by management. The colored columns indicate the signals for market share, quality relative to competition, price relative (RP) to competition and marketing aggressiveness (Mktg/M). The signals are provided for each of the next five years.

Each box represents one year. Boxes are color coded to indicate the recommended message, as follows:

- Red: *reduce* the level of this tactic relative to the level indicated in the Base strategy.
- Blank: keep the level of this tactic approximately the same as the level indicated in the Base strategy.
- Green: *increase* the level of this tactic relative to the level indicated in the Base strategy.

So, in the face of reduced market growth (shock #2) for our example business, management should consider the following:

- Engaging in more aggressive market share gain.
- Allowing the quality reputation of the product and or related services to decline.
- Lowering price relative to competitors.
- Spending more aggressively on marketing.

StratLab produces similar graphic output for many other expense and investment-oriented tactical measures.

By comparing the contingency response plans developed for each major risk, you can identify actions that have a *pervasive* beneficial effect. For example, if improving product quality, or outsourcing some of your supply activities, is helpful in mitigating the effect of a wide range of possible shocks, you may well decide to implement these programs now, *before* specific threats appear. For the business in **Exhibit 5**, lowering prices relative to competitors appears to be helpful across all scenarios.

Because each business and industry has a set of specific characteristics, the prescriptions for every business are highly customized.

Risks ( Selected Scenarios)								
	Base	1	2	3	4	5	6	7
Strategies								
Base	Green	Green	Green	Red	Red	Red	Red	Green
A	Red							
B	Red	Green	Green	Green	Red	Red	Red	Red
C	Green	Red						
D	Red	Red	Red	Red	Red	Green	Green	Green
E	Green	Green	Red	Red	Red	Red	Red	Green
F	Green	Green	Green	Green	Red	Red	Red	Red

Exhibit 6

### Develop your strategy risk map.

With a formidable amount of number-crunching, StratLab draws your strategy risk map, as in **Exhibit 6**. The map displays how the Total Return for your business is likely to vary depending on the strategies management pursues and the scenarios that evolve. All cells shaded in green earn a Total Return above zero, and therefore generate at least their cost of capital. Those in red generate a Total Return below zero, and therefore destroy economic value.

Some strategies will do relatively well across a wide range of scenarios, and some will do well only against a few. Some scenarios will be very difficult to handle, as indicated by the prevalence of red cells down their column.

### Does StratLab work for your business?

How do you decide whether StratLab understands your business, and whether its recommended strategies make sense in your specific situation?

This question should, of course, be asked of all sources of business strategy advice.

Most (although not all) executives do not care to delve into the technical underpinnings of the simulation. Some find it helpful to

review the empirical research findings baked into its equations.

Our experience, however, is that most decision-makers evaluate the model's credibility by:

- Examining whether the model fairly describes the behavior of the business during the recent past. In fact, we use this standard to judge when we have adequately calibrated (or customized) the model to represent your business.
- Bringing to bear management's specific knowledge of their business and industry to judge whether the model's projections make sense and whether the recommendations are feasible.

### **Implementation process**

How can you build company support to integrate business strategy risk management into your strategic planning process? Here are three possible approaches.

1. Concentrate on examining many risks in a single business. Demonstrate value of the approach to build support for ERM in other businesses.
2. Focus on a few critical risks across your key businesses. For example you could examine macroeconomic shocks (changes in interest rates, GNP growth) or competitive shocks (price wars, sudden drop in your relative quality reputation). You might compare these to other risks traditionally managed by the firm.
3. Conduct a comprehensive analysis of strategy risk throughout the company, across businesses to:
  - Identify pervasive threats and opportunities that deserve corporate-level attention. [Example: need to provide corporate support for stepped-up marketing across most businesses.]
  - Understand how risks are correlated. Some threats that seem significant at the business level may be less critical at the portfolio level because of countervailing impacts.
  - Improve capital allocation across the firm by taking into account risk-adjusted returns.

StratLab requires significant input about a business and competitors' personalities. So, whichever approach you choose, you will

need to work closely with business managers. The process cannot (and should not) be conducted completely as a top-down activity.

## Our principals managed the PIMS™ program.

### StratLab's benefits recapped.

By combining (a) cutting-edge simulation technology and (b) disciplined empirical, cross-sectional research on the consequences of business strategies, StratLab offers:

- A *process* that promotes rapid management education about competitive interplay. It encourages rapid experimentation and provides a common language and structure for describing complex strategies and scenarios. The process is valuable for experienced managers dealing with unfamiliar possible scenarios and for new staff, to accelerate learning.
- A *tool* for realistically (a) quantifying the impact of a wide spectrum of potential strategy risks to your business (b) developing contingency plans (at least in broad outline) for responding to each significant potential crisis and opportunity.
- A better understanding of the risk profile of potential acquisition candidates.
- A "best practice" that can be presented to investors as part of your investor relations program.
- Suitable analytic technology for doing the above quickly and reasonably accurately, without placing undue strain on your resources.

In the end, the real value of StratLab is that it integrates risk management and strategic planning. Aligning the two functions causes them to focus on events and strategies that really matter. The benefit: a better mix of "expected" results and risk, and thereby an increase in the projected total returns to your company.

### **Credits and references**

<sup>1</sup> Slywotsky, Adrian J., Quella, James A., and Morrison, David J., "Countering strategic risk with pattern thinking: How to identify tomorrow's profit zones before the competition," *Mercer Management Journal*, No. 11.

### **About the authors**

Gerard Badler and Joaquim Branco are principals in the management consulting firm MANTIS/Empirimetrix, located in Boston, Massachusetts. They previously played leading roles in The PIMS Program—a consortium of 300 large corporations worldwide. They can be contacted at (617) 948-2650, or through email at [info@empirimetrix.com](mailto:info@empirimetrix.com), or via [www.empirimetrix.com/risk](http://www.empirimetrix.com/risk).

**MANTIS ● Empirimetrix**

MANTIS/Empirimetrix  
20 Park Plaza  
Boston, Massachusetts 02116

VOX 617.948.2650  
FAX 508.519.7931  
[www.empirimetrix.com/Risk](http://www.empirimetrix.com/Risk)  
[info@empirimetrix.com](mailto:info@empirimetrix.com)