



The Association of
Accountants and
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in Business



Strategic Risk Management: Optimizing the Risk-Return Profile

Statement on Management Accounting

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Executive Summary

As a member of the board of directors or senior management, which risks should you be most concerned about?

Recent business headlines have focused attention on Federal Reserve interest rate policy, economic slowdown in China, declining oil prices, Middle East instability, international and domestic terrorism, and cybersecurity. In its *Global Risks Report 2016*, the World Economic Forum identified five top worldwide risks with the greatest potential impact:

1. Failure of climate change mitigation and adaptation
2. Weapons of mass destruction
3. Water crises
4. Large-scale involuntary migration
5. Severe energy price shock

As a board member or manager, your job in risk oversight or risk management is to consider these macro-risks, but more importantly, to optimize your company's risk-return profile based on the interactions of these macro-risks and the specific risks that are unique to your industry and business model.

The nature, level, and velocity of risks have changed in the past and will continue to change in the future. One risk in particular that should always be at the forefront of risk management is strategic risk. Strategy provides the overall plan for an organization to achieve its core mission and increase value to its key stakeholders (e.g., customers, employees, shareholders, regulators, etc.). Strategic risk can result throughout the strategy development and execution processes, including:

- Design and development of the corporate strategy, including alignment with the core mission, business-unit strategies, and operating budgets;
- Execution of the corporate and business-unit strategies to achieve key organizational objectives;
- Actions and reactions from customers, suppliers, and competitors, as well as the impact of emerging technologies; and
- Resultant risks (which can be strategic, operational, or financial risks) from the execution of corporate and business-unit strategies, including the utilization of risk appetite and risk capacity.¹

This Statement on Management Accounting (SMA) provides board members; corporate executives; and risk, compliance, finance, and audit professionals with a set of guidelines, best practices, and practical examples for measuring and managing strategic risk. In this SMA, we will discuss:

¹ James Lam, *Implementing an Effective Risk Appetite*, IMA® (Institute of Management Accountants) Statement on Management Accounting, August 2015.



- The importance of strategic risk—particularly given the typical high failure rate of strategic initiatives and empirical studies that show the impact of strategic risk exceeds the impact of all other forms of risk combined;
- Measuring strategic risk using economic capital, shareholder value-added, and other risk-adjusted performance measures;
- Managing strategic risk through strategic planning, risk appetite, new business development, mergers and acquisitions (M&A), and capital management processes; and
- Ongoing monitoring and feedback, including the integration of key performance indicators, key risk indicators, and performance feedback loops to support board and management oversight.

The Importance of Strategic Risk

One of the most important responsibilities—perhaps the most important responsibility of the board of directors and senior management—is setting the company’s strategic direction in order to maximize shareholder value. To do so, executives must be able to anticipate key trends and future opportunities. But of course no matter how confident you may be, the future is not foreseeable. In other words, strategy involves risk. In this SMA, we will take a look at how the practice of strategic risk management arose as enterprise risk management (ERM) matured over the past decades. We will examine the role that risk analysis and management can have in strategic planning. We will also show ways that strategic risk can be accurately measured, managed, and monitored on a continuous basis. Additionally, we will provide several case studies involving familiar multinational corporations and explain how they manage strategic risk.

As senior management gathers to set strategic priorities, it is faced with a daunting task. Each decision is, in essence, a wager that bets the company’s available resources on informed predictions about macroeconomic, industry, and market trends. They are betting on the company’s core competencies and its ability to find areas of growth even as it tries to avoid visible and unforeseen pitfalls. How large a bet that management and the board are willing to make depends on the size of the organization, its maturity, and how capable the company is to face the risks and opportunities before it. A winning bet will increase shareholder value, while ill-advised or bad bets may reduce value or, in the worst case, destroy it entirely.

Strategic Decisions Have a High Failure Rate

While reliable statistics are difficult to come by, it is no secret that many strategic initiatives fall short of expectations. The oft-quoted 70% failure rate enshrined in management lore may lack empirical support.² But high success rates are still the exception rather than the rule. In 2008, John Kotter, a leading expert in change management, summed up his experience:³

² Mark Hughes, “Do 70 Per Cent of All Organizational Change Initiatives Really Fail?” *Journal of Change Management*, November 2011, pp. 451-464.

³ John Kotter, “A Sense of Urgency,” *Harvard Business Review*, September 3, 2008.



From years of study, I estimate today more than 70% of needed change either fails to be launched, even though some people clearly see the need, fails to be completed, even though some people exhaust themselves trying, or finishes over budget, late, and with initial aspirations unmet.

Whatever the true failure rate for strategic initiatives, companies have every incentive to improve performance by increasing the likelihood that they will achieve strategic goals at least in some measure.

Strategic risk can take various forms. One is simply pursuing the wrong strategy, such as overinvestment in a new product or a pursuit of the wrong acquisition candidate. Even with the right strategy, failing to execute the strategy effectively is another risk. There is also the risk of inaction or not responding to key market trends. Outside factors, such as customer trends and emerging technologies, may render the existing strategy ineffective or outdated. This has become increasingly common in an age when mobile devices are replacing desktop computers (which themselves had replaced mainframes). In these cases, being on the wrong side of technological evolution can destroy considerable value. But if you're the disruptor, you can actually use these same opportunities to create enormous value. Finally, strategy execution will likely impact the overall risk profile of the company, including second-order strategic risks, operational risks, and financial risks. All of these risks must be considered as part of ERM.

Companies ignore strategic risks at their peril. Independent studies of the largest public companies have shown time and again that strategic risks account for approximately 60% of major declines in market capitalization, followed by operational risks (about 30%) and financial risks (about 10%).⁴ Yet, in practice, many ERM programs downplay strategic risks or ignore them entirely. There are some historical reasons for that. When companies began to develop formal ERM programs in the early 1990s, they focused almost exclusively on financial risk, due to some high-profile losses stemming from derivatives and the fact that financial risk (i.e., interest rate risk, market risk, credit and counterparty risk, and liquidity risk) is more quantifiable.

In the mid-1990s, several disasters related to unauthorized trading at financial firms shifted attention toward operational risks even though they are harder to measure. The difficulty in measuring these risks lies in the nature of operational glitches, the vast majority of which are commonplace but financially insignificant. On the rare occasions when operational controls do break down, the consequences can be devastating—and not only for banks. One example is the 2010 Deepwater Horizon catastrophe. In addition to the damage and impact of the oil spill itself, the event also inflicted enormous financial and reputational damage on British Petroleum, Transocean, and Halliburton.

But if the goal of ERM is to enable management to identify, prioritize, and manage key risks, it is clear that programs ought to give the highest priority to strategic risks, followed by operational risks. The financial risks that dominate ERM today should come a distant third.

⁴ James Lam, *Enterprise Risk Management: From Incentives to Controls*, Second Edition, Wiley 2014, pp. 434-436.



What Is Strategic Risk?

Strategic risk can be defined as any risk that affects or is inherent in a company's business strategy, strategic objectives, and strategy execution. The list includes:

- Consumer demand
- Legal and regulatory change
- Competitive pressure
- Merger integration
- Technology change
- Senior management turnover
- Stakeholder pressure

Other risks may qualify for particular companies depending on the nature of their business. Siemens, the European conglomerate, captures this sentiment in its broad definition of strategic risk: "everything, every obstacle, every issue that has the potential to materially affect the achievement of our strategic objectives."⁵

Yet it is important to make a distinction between operational and strategic risk. A company that has unmatched manufacturing processes will still fail if consumers no longer want its products. Whether they knew it or not, even the most efficient buggy whip makers faced an existential threat in 1908 when Henry Ford introduced the Model T. In more recent times, Apple transformed the competitive landscape for cellular handset makers the day it launched the first iPhone. Good operations means doing things right, while good strategy means doing the right things. Successful companies must do both under uncertainty (risk management).

The ability to recognize and manage strategic risks is critical to the sustainable success of any company. The rest of this SMA explains how to consider strategic risks in the planning process, how to use economic capital and risk-adjusted return on capital to measure these risks, and how to apply the results in practice.

Measuring Strategic Risk

At one time, strategic risk was measured solely in qualitative descriptors. But the latest yardsticks developed to measure financial risk—economic capital and risk-adjusted return on capital (RAROC)—can be applied to operational and strategic risks as well. This paves the way for strategic risk management to become a top priority for ERM practitioners—the next frontier in the challenge to control and manage risk.

In order to evaluate the effectiveness of strategic risk management, an organization must first determine the *measures of success* for the execution of its strategy, such as product innovation, enterprise earnings, return on equity, and shareholder value. The next step is the identification and assessment of key strategic risks, which may include regulatory approvals,

⁵ Deloitte, *Exploring Strategic Risk*, 2013.



product pricing, sales effectiveness, and market share. While the overall strategy is meant to increase the expected value of the measures of success, strategic risks may drive variability in the same measures for better or worse.

Economic Capital

Risk identification and assessment is the first step, but a company must measure risks before it can manage them. Economic capital is a common currency whereby any risk can be quantified, thus making it one of the best available metrics.

Firms in any industry hold capital for two primary reasons: (1) to fund ongoing operations and investments and (2) to protect against unexpected losses. Unlike book capital, which is an accounting measure that represents the sum of invested capital and retained earnings, economic capital represents the amount of capital required to absorb unexpected loss. A simple example can illustrate the difference between book capital and economic capital: A company that increases its risk exposures, say by increasing foreign exchange exposures or operational risks, will not instantaneously increase its book capital. Its book capital will reflect this shift over time only as the company experiences actual losses and actual retained profits. But its required economic capital will immediately increase as soon as its risk exposures increase.

A comparison between book capital and economic capital, while they are different, is very useful for determining capital adequacy. A company is overcapitalized if its book capital is above economic capital, and it is undercapitalized if the reverse is true. It is also important to note that book capital is a financial indicator of past performance, whereas economic capital is a forward-looking indicator of future performance. Strategic risk, as with all key risks, is about the future.

The basic steps for calculating economic capital are:

1. Establish a solvency standard for the overall company, as reflected in its target debt rating.
2. Measure the economic capital for individual risks based on the fundamental risk exposures and the solvency standard.
3. Aggregate the economic capital across individual risks, incorporating the correlation effects between risks.

The solvency standard is the desired creditworthiness of an organization, which can be inferred from its target debt rating. For example, an institution that has a target solvency standard of 99.9% would default, on average, only once every 1,000 years. This is roughly equivalent to an institution awarded an "A" rating by the debt rating agencies.

A higher solvency standard implies that more economic capital is held for a given level of risk. Put another way, the greater the risk that an institution bears, the greater the financial resources it must have in order to maintain a given solvency standard. A widely accepted theoretical framework for relating the amount of capital a company needs to hold against a given level of risk is based on Robert Merton's model of default, which states that a company's shareholders own the right to default on payments to debt holders and will do so if the value of the firm's equity (i.e., net assets) drops below zero. Debt holders charge shareholders for default risk by demanding a spread over the risk-free rate on the funds they provide. The probability of



default is a function of the current level and potential variability (the probability distribution) of a firm's net asset value.

The calculation of an organization's economic capital is generally done "bottom up." That is, the economic capital is calculated separately for each type of risk and then aggregated, taking into account the effects of diversification, to come up with the overall economic capital for the entire enterprise. Economic capital also applies the same methodology and assumptions in determining enterprise value.

For strategic risks, the calculation is forward looking: the capital required to support new product launches or potential acquisitions, for example, or to withstand anticipated competitive pressure. The basic process is:

1. Generate standalone distributions of changes in the enterprise's value due to each source of risk.
2. Combine the standalone distributions, incorporating diversification effects.
3. Calculate the total economic capital for the aggregate distribution at the desired target solvency standard.
4. Attribute economic capital to each risk based on the amount of risk generated.

Risk-Adjusted Return on Capital

Dividing the anticipated after-tax return on each strategic initiative by the economic capital generates risk-adjusted return on capital (RAROC). If RAROC exceeds the company's cost of capital (K_e , or cost of equity capital), the initiative is viable and will add value; if RAROC is less than K_e , it will destroy value. But the decision whether to back an initiative should not depend on a single case reflecting the expected value. The company should run the numbers for multiple scenarios to see the distribution of results in both more and less favorable circumstances or in combinations of better and worse conditions over time. The final decision will depend on the specific company's risk appetite.

RAROC can be calculated for an institution as a whole or separately for each of its individual activities. Because the amount of economic capital that is required to support each of the enterprise's activities is proportional to the risk generated by that activity, economic capital can be used as a standard measurement of risk. Combining the economic capital required to support the risks of an activity with the activity's expected economic returns yields a ratio that represents the amount of return the institution expects per unit of risk involved:

$$\text{RAROC} = \text{risk-adjusted return} / \text{economic capital}$$

The risk-adjusted return is based on either net income or expected return. RAROC using net income provides an indication of actual profitability, whereas the use of expected return provides a measurement of normalized profitability. This is particularly relevant when applying RAROC to credit risk-related activities because expected losses are often used in the calculation of return rather than actual losses.

The primary use of RAROC is to compare the risk-return trade-offs of different, and potentially quite diverse, strategic decisions. Economic capital/RAROC analysis works for organic



growth initiatives as well as potential acquisitions. For example, a company with excess capital can determine if it is in the best interest of shareholders to buy back stock, grow the core business, or make a strategic acquisition. We will take a closer look at M&A decisions below.

Key Relationships Between Risk, Economic Capital, and Value Creation

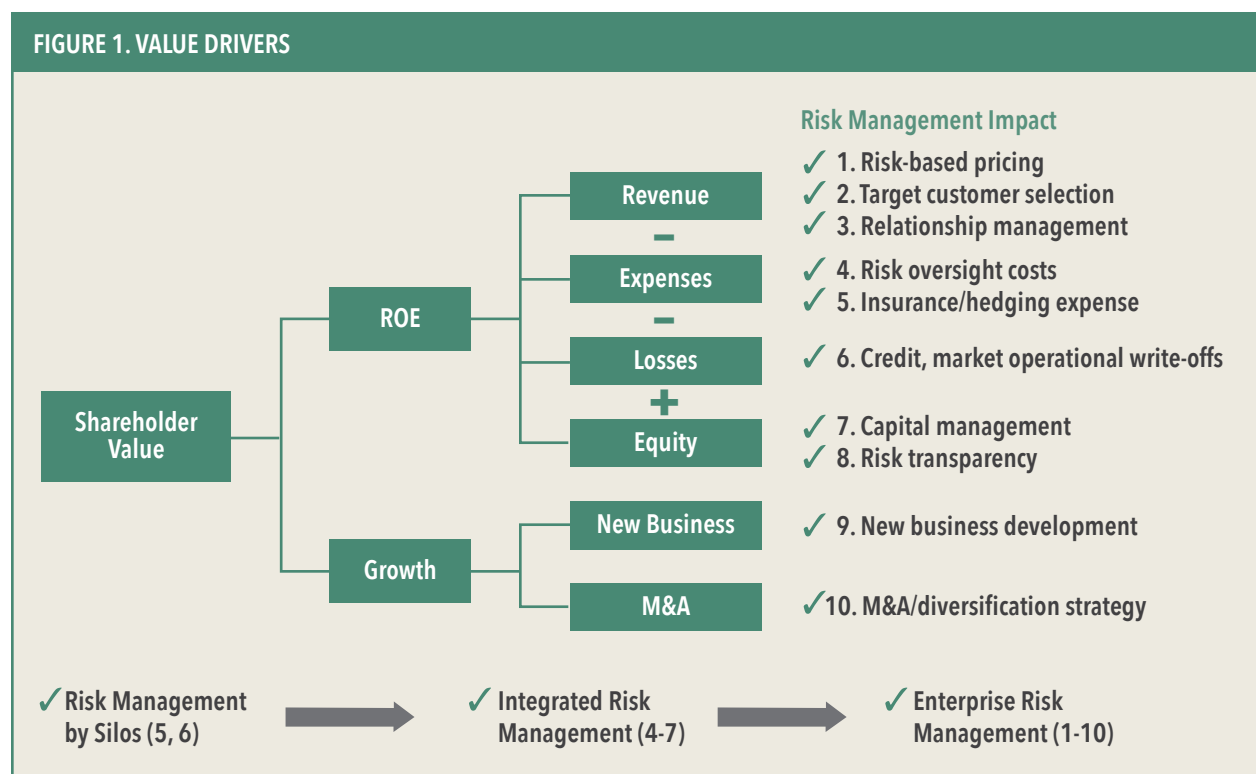
Let's take a look at how enterprise-wide risks, economic capital, and shareholder value are related. Recall that economic capital can be defined as the required level of capital required to adequately cover the risks that a company faces, more commonly known as its risk profile. The more risk the company takes on, the more economic capital is required to cover it. Economic capital, in turn, affects shareholder value in terms of return on that capital.

Value can thus be expressed in terms of RAROC as follows:

$$M/B = (RAROC - g) / (Ke - g)$$

Where M = market value, B = book value, Ke = cost of equity capital, and g = annual earnings growth rate.

Figure 1 indicates the interactions among a company's value drivers (such as revenue, expenses, and growth strategies) and how ERM could impact each of them.





In addition to economic capital and RAROC, companies deploy other methodologies to measure and manage strategic risk, such as net present value (NPV) calculations based on risk-adjusted discount rates or EVA® (Economic Value Added) models. The advantage of economic capital and RAROC models is that the analytical results are linked to earnings, capital management, and shareholder value maximization.

In the next section, we will discuss examples of increasing shareholder value through the value drivers in strategic risk management.

Managing Strategic Risk

Strategic risk management addresses the question of what specific decisions and actions are required to optimize the long-term risk-return profile of the company. Key decision points include:

- **Risk acceptance or avoidance:** The organization can decide to increase or decrease a specific risk exposure through organic growth, its core business (new product and business development), mergers and acquisitions (M&A), and financial activities.
- **Risk-based pricing:** All organizations take risks in order to be in business, but there is only one point at which they can get compensated for the risks that they take. That is in the pricing of their products and/or services, which should fully incorporate the cost of risk.
- **Risk mitigation:** This involves the implementation of business and risk control strategies in order to manage strategic risk within defined risk tolerance levels.
- **Risk transfer:** If risk exposures are excessive and/or the cost of risk transfer is lower than the cost of risk retention, an organization can decide to execute risk transfer strategies through the insurance or capital markets.⁶
- **Resource allocation:** An organization can allocate human and financial resources to business activities that produce the highest risk-adjusted returns in order to maximize firm value.

Risk management is an ongoing process, and strategic risk is no exception. Though it presents its own particular challenges, monitoring strategic risk can give companies a critical “heads-up” to oncoming obstacles. This, in turn, offers the greatest possible latitude when it comes to adjusting strategic or tactical efforts in order to mitigate downside risk or take advantage of an unexpected opportunity.

⁶ For example, an acquirer may purchase insurance and/or issue a catastrophe bond to reduce an undesirable risk from a potential acquisition (e.g., product liability, natural disasters, or multiple events or triggers).



Three Lines of Defense Model

While it is important to understand the general decision choices an organization can make, in practice risk management decisions are made by a specific committee, function, or individual. These decision makers can be the board of directors, corporate management, or business and functional units. Figure 2 provides a summary of key risk management decisions based on the three lines of defense model.



With respect to strategic risk management, the roles and responsibilities of the three lines of defense are:

1. **Business Units and Support Functions:** Business units and support functions (e.g., information technology or human resources) represent the first line of defense, and they are ultimately accountable for executing the business-unit strategies and support activities in alignment of the strategic plan. To achieve their business objectives, they must assume risks that are consistent with the organization's risk appetite. Key business and risk management decisions would include accepting or avoiding risks in day-to-day business activities and operations, establishing risk-based product pricing and managing customer relationships, and implementing tactical risk mitigation strategies and contingency plans in response to risk events.
2. **Corporate Management:** Corporate management, supported by the ERM and compliance functions, represents the second line of defense. They are responsible for establishing and implementing risk and compliance programs, including risk policies and standards, risk appetite and tolerances, and board and management reporting processes. This line of defense is accountable for ongoing strategic risk monitoring and oversight. Key business and risk management decisions include allocating



financial and human capital resources to business activities that produce the highest risk-adjusted profitability and implementing organic and/or acquisition-based growth strategies and risk transfer strategies to reduce excessive or uneconomic risk exposures.

3. **Board of Directors:** The board of directors, with the support of the audit function, represents the third line of defense. It is responsible for establishing board risk governance structure and oversight processes; reviewing, challenging, and approving risk policies; and overseeing strategy development and execution, and executive compensation programs. This line of defense is accountable for the periodic review and assurance of risk management effectiveness. Key business and risk management decisions would include challenging and approving the business strategy; establishing the statement of risk appetite and risk tolerance levels; reviewing and approving management recommendations with respect to capital structure, dividend policy, and target debt ratings; and reviewing and approving major investments and transactions.

Strategic Planning and Review

The start of the strategic risk management process is strategic planning. There are several management frameworks that companies can choose from to plan out their strategy. They may begin by analyzing their strengths, weaknesses, opportunities, and threats (SWOT) to determine where best to focus new initiatives. From there, many turn to Kaplan and Norton's balanced scorecard to evaluate each initiative from different perspectives, including customers, internal processes, organizational capacity (knowledge and innovation), and financial performance. Others prefer Michael Porter's Five Forces model, which analyzes the effect on new initiatives of supplier power, buyer power, industry competition, threat of substitution, and threat of new entry.

These popular strategic planning tools provide structure to the process, but risk professionals have long recognized a major flaw: They do not fully take risk into account.⁷ In the aftermath of the 2008 financial crisis, Kaplan himself acknowledged the shortcoming: "... the measurement, mitigation, and management of risk have not been strongly featured in David Norton's and my work."⁸

Risk Appetite

The strategic initiatives that are approved—and the triggers for acceleration or corrective action—all depend on a company's risk appetite. ERM implementation requires a company to create a risk appetite statement that defines how much risk it will take in pursuit of its business strategy. For strategic risks, the risk appetite metrics typically are defined through the potential impact on earnings or enterprise value arising from adverse business decisions or lack of responsiveness to industry changes.

⁷ "A good case can be made that the balanced scorecard (or any other business reporting methodology) should include a risk assessment either as a separate category or as a part of each of the four performance components."
James Lam, *Enterprise Risk Management*, First Edition, John Wiley & Sons, 2003.

⁸ Robert Kaplan, "Risk Management and the Strategy Execution System," *Balanced Scorecard Report*, 2009.

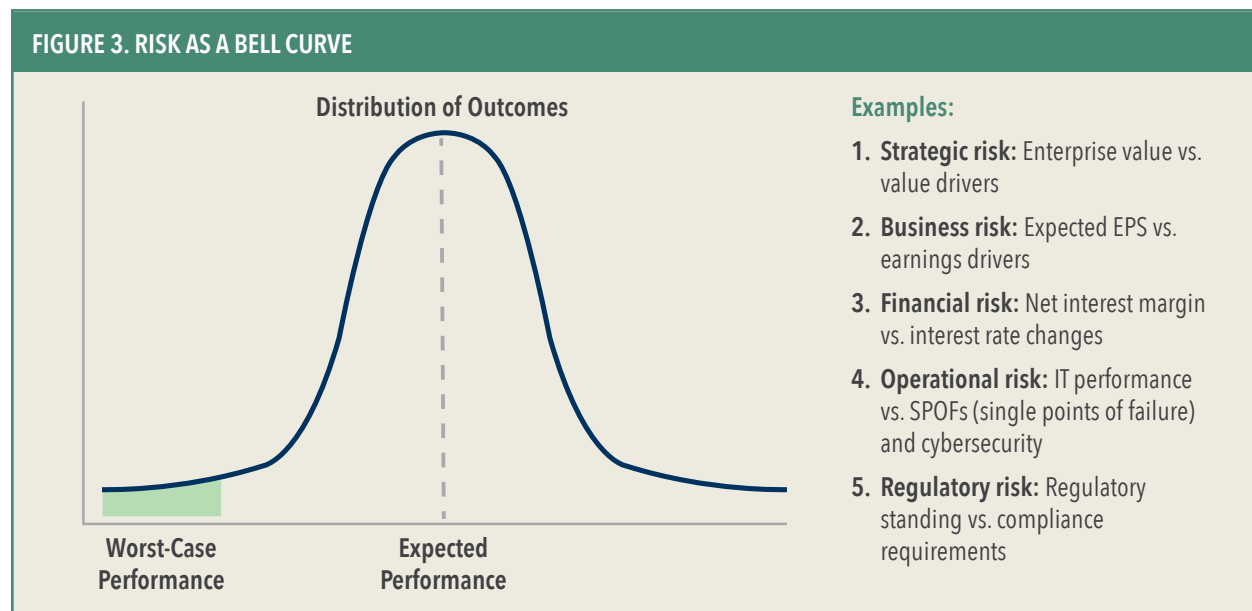


Rigorous use of standard planning tools generates an expected value for each strategic initiative without regard to the distribution of outcomes around that value if the projected results are not achieved. Yet every initiative involves risk, and risk is a bell curve centered on the expected value, either today or at some future date, with tails trailing off toward worse or better performance. Companies that ignore risk in the planning process forgo the opportunity to manage the shape of that curve.

For example, two initiatives with identical expected values may have quite different risk profiles. One may have a narrow bell curve, which implies a higher probability the expected outcome will occur, a low risk of failure, and little opportunity for an unexpected windfall. The other may have a fat bell, suggesting that an outcome other than the expected value is more likely. Planning tools give no guidance on how to choose between the two, and the “right” choice will not be the same in every case because companies have different appetites for risk.

Determining the Optimum Risk Profile

Although risk always takes the form of a bell curve, not all bell curves are alike. Figure 3 shows how the bell curve can be used to capture various risks.⁹



Interest rate risk or market risk can be plotted on an essentially symmetrical curve, as interest rates or market prices have an equal chance of moving with you or against you. On the other side of the spectrum, operational and compliance risk have a limited upside but a lot of potential downside. After all, not having any IT, compliance, or legal issues simply means business as usual. But a major negative event, such as a security breach, IT downtime, or regulatory issue, can have tremendous downside consequences.

⁹ For simplicity, a symmetrical or normally shaped bell curve is shown. But the specific shape of the bell curve (e.g., shape, skewness) will depend on individual risks faced by an organization



If managed well, strategic risk is unique in that its downside can be limited while its upside can be unlimited. A recent example is Uber, a disruptive technology company that is changing the ground transportation industry. Its valuation has gone from \$60 million in 2011 to more than \$50 billion in 2016. An asymmetrical bell curve with significant upside risk can be found with any new product or business opportunity, whether that opportunity is part of a corporation's growth strategy or a venture capital firm's new investment.

Consider a decision tree that maps the probabilities and consequences of different decision paths.¹⁰ This map not only provides a better picture of the risks and rewards involved, but also helps identify trigger points for action if the initiative lags behind expectations. Taken this way, the optimum strategic risk profile resembles a call option: limited downside exposure with unlimited upside potential. The sooner a company recognizes an initiative is in trouble, the sooner it can take corrective action—such as getting the initiative back on track, deploying risk mitigation strategies, or shutting it down.

The objective to minimize downside and increase upside is the basis of real option theory. A real option is the right, but not the obligation, to undertake a business investment or to change any aspect of that investment at various points in time, given updated information. The beneficial asymmetry between the right and the obligation to invest under these conditions is what generates the option's value.

Venture capital firms take advantage of this asymmetry as part of their business model. According to research by Shikhar Ghosh, a senior lecturer at Harvard Business School, about 75% of venture-backed firms in the United States do not return investors' capital and 95% fail to see the projected return on investment. That leaves a success rate of only 5%.¹¹ To maintain an ideal risk profile, the funds would carefully stage the funding rounds and reap outsized returns on the 5% of firms that are successful while exiting or minimizing their investments in the other 95%.

Pharmaceutical companies take a similar portfolio approach. They invest in drug development internally, or buy patents that look promising or entire drug companies. They can then continue to make limited, iterative investments in successful ventures and bow out of those that fail to achieve expected performance levels.

¹⁰ The classic decision tree is a similar construct as a bell curve, except that it is displayed sideways and used to support decision making at critical junctures.

¹¹ Deborah Gage, "The Venture Capital Secret: 3 out of 4 Start-Ups Fail," *The Wall Street Journal*, September 20, 2012



Case Study: GE Capital 6.0

During the 1990s, GE Capital employed a version of real options in its Policy 6.0 program. Under this program, if an investment does not live up to expectations, management has the option to mitigate or exit, thus limiting exposure. For new products, new businesses, or mission-critical projects, Policy 6.0 represents a practical best-practice model for strategic risk management. It requires a detailed analysis of strategic risks associated with any new initiative as well as quarterly reviews between business leaders and GE corporate executives to monitor and manage business performance relative to clear expectations. The major components of Policy 6.0 include:

- **Key Assumptions:** The new business must identify the key assumptions that support its feasibility, often including the most critical strategic risks such as business trends, customer needs, and disruptive technologies.
- **Monitoring Systems:** For each assumption, the business must identify monitoring systems for key performance indicators, key risk indicators, and early warning indicators. They must also specify the individuals responsible for oversight.
- **Trigger Points:** For critical metrics, the business must establish predefined positive, expected, and negative trigger points to initiate management actions or reviews in between the quarterly reviews. Breaches of significant thresholds may trigger immediate escalation and special reviews.
- **Management Decisions and Actions:** Positive trigger points signify results that are better than expected, which may prompt management to accelerate the business plan or take more risk. Negative trigger points give management the opportunity to initiate risk mitigation strategies or an exit strategy if key metrics and trends are well below expectations.

Risk-Based Pricing Decisions

As discussed earlier, the most effective way for companies to ensure an appropriate return on the risks that they are willing to accept is to incorporate the cost of risk into their pricing methodologies. If the cost of risk is not fully reflected in the initial pricing (for example, if the product or transaction is underpriced relative to the risk), then there is nothing the company can do to recover its costs. Risks that are underpriced may increase revenue and growth in the short term, but over time they will destroy shareholder value. When quantifying the total cost of risk, companies should include:

- Expected loss (EL), or average loss per year over a business cycle;
- Unexpected loss (UL), which can be defined as economic capital \times K_e (cost of equity capital);
- Risk transfer costs (of hedging or insurance); and
- Risk management costs (that pertain to maintaining staff, systems, etc.).

Figure 4 shows a numerical example of risk-based pricing, which is based on the same methodology used to calculate RAROC.

In the first column, "Calculate RAROC," the math works from top to bottom. We have a \$100 million transaction and a 2.5 % margin, resulting in \$2.5 million in revenue. Pre-tax net income of \$1 million is derived after subtracting risk losses (expected loss) of \$500,000 and expenses of \$1 million. Assuming a 40% tax rate, net income of \$600,000 is calculated. In this example, \$2 million of economic capital is allocated based on the underlying risks of the transaction. Finally, a 30% RAROC is quantified by dividing net income by economic capital.



FIGURE 4. MEASURING PROFITABILITY AND PRICING

	Calculate RAROC	Calculate Pricing
Exposure	\$100 million	\$100 million
Margin	2.50%	2.20%
Revenue	\$2.5 million	\$2.2 million
Risk Losses	(\$500,000)	(\$500,000)
Expense	(\$1 million)	(\$1 million)
Pre-Tax Net Income	\$1 million	\$700,000
Tax	(\$400,000)	(\$300,000)
Net Income	\$600,000	\$400,000
Economic Capital	\$2 million	\$2 million
RAROC	30%	20%

This 30% RAROC metric can be very useful in decision making in two ways. First, it can support product and customer management strategy. If RAROC is greater than K_e , then the transaction or customer is creating shareholder value and the company should increase this business. Conversely, if RAROC is less than K_e , then the transaction is destroying shareholder value and the company should discontinue this business, increase pricing of future transactions, or cross-sell more profitable products to the same customer to increase the overall RAROC of the relationship to be greater than K_e .

Second, RAROC can support business management and resource allocation. The calculated RAROCs of different business units can be compared against each other because they provide a consistent risk-adjusted measurement of profitability. Other profitability measures—such as profit margin, ROA, and ROE—are not risk-adjusted, so any comparisons might lead to wrong conclusions. For example, a business unit with marginally lower ROA and ROE might be more attractive than another business unit if the former has a substantially lower risk profile. RAROC analyses support management decisions regarding which businesses to grow, maintain, fix, shrink, or exit.

In our example, how should the company respond if a close competitor decides to introduce a discount pricing strategy by charging a 2.3% margin (instead of 2.5%)? Risk-based pricing can be used to support that business decision. This is demonstrated in the Calculate Pricing column of Figure 4, where the math works backward or from bottom to top. Say the company decides that a 20% RAROC is the minimum hurdle rate of profitability that it wants to achieve for this business. By applying the same methodology but in reverse, a 2.2% margin is calculated as the risk-based pricing that would achieve a 20% RAROC.

For more than 20 years, banks have applied economic capital, risk-based pricing, and RAROC analysis in managing their businesses. Banks use these tools to measure risk-adjusted profitability and pricing for a wide range of products and services, including commercial loans,



consumer loans, derivative products, and investment banking and brokerage services. But risk-based pricing is also a critical practice for nonfinancial companies. The Airbus case study shows the potential pitfalls when strategic programs do not fully account for the cost of risk.

Case Study: Airbus

After five rocky years of delays and cost overruns for two high-profile product launches, European aviation giant Airbus acknowledged in 2010 that a large part of its problems related to the fact that it failed to account for risk in its pricing strategy.

At the time, two of Airbus's biggest programs—the A380 superjumbo jetliner and the A400M military transport plane—were years behind schedule and billions of dollars over budget. Several smaller programs also faced issues meeting deadlines and fulfilling customer requirements. Louis Gallois, CEO of Airbus parent the European Aeronautic Defence and Space Company (EADS), admitted that the company generated “insufficient” profit due to problems with the flagship programs. EADS CFO Hans Peter Ring added that the core issue was the difficulty in matching the heavy demands of customers against the ambitious financial returns expected by investors. “We are in a high-tech, complex business, and there is a lot of risk in our business. That won't change,” Ring said in an interview with *The Wall Street Journal*, “The question is how to price risk. Obviously, in some cases we didn't price it right.”

As it turns out, Airbus mispriced the risks given the operational complexities of these two programs. In selling the two-deck A380, it urged buyers to specify unprecedented levels of luxury onboard. The complexity of customizing planes with showers and private suites overwhelmed Airbus production systems. And in 2003, EADS signed a contract with seven NATO countries to deliver the A400M, the world's most sophisticated propeller-driven military transporter, under rigid contract terms normally used for simpler passenger jets. The project was more difficult than Airbus expected, and it quickly blew through the fixed-price budget.

“The way we made our commitment for development and production of the plane under a fixed-price contract was not the right way,” Ring said.

M&A Decisions

M&A transactions can have a profound impact on the fortunes of companies. A good deal can help a company leapfrog its competitors, while a bad deal can set it back many years. The ERM function can support critical decisions in M&A by assessing the risk profile of the target company and the risk-return economies of the combined organization.

Traditional merger analysis is based on financial projections of the companies operating as independent entities as well as a combined company. Based on these financial projections, potential earnings dilution/accretion can be estimated for a range of assumptions of acquisition price, revenue growth, and cost synergies. But traditional earning dilution/accretion analysis does not fully adjust for risk. As such, it can lead to the wrong M&A decisions with adverse strategic and financial consequences.

Let's examine how ERM can help a company make better M&A decisions. Figure 5 provides an example of an M&A analysis.

In this example, Company A is considering acquiring either Company B or Company C. To simplify this example, assume that both companies can be acquired for the same price. Based on traditional financial analysis, Company C appears to be more attractive because it has a higher RAROC and a higher market-to-book (M/B) ratio than Company B. In M&A parlance, acquiring Company C would be antidilutive (no earnings dilution) while acquiring Company B would be dilutive.



FIGURE 5. MERGERS & ACQUISITIONS

	A	B	C	A+B	A+C
Revenue	100	50	50	150	150
Expense	<u>50</u>	<u>30</u>	<u>25</u>	<u>80</u>	<u>75</u>
Pre-Tax	50	20	25	70	75
Tax	<u>20</u>	<u>8</u>	<u>10</u>	<u>28</u>	<u>30</u>
Net Income	30	12	15	42	45
Economic Capital	<u>200</u>	<u>100</u>	<u>100</u>	<u>210</u>	<u>270</u>
RAROC	15%	12%	15%	20%	17%
M/B Ratio	1.00	0.67	1.00	1.50	1.20

Note: This assumes $K_e = 15\%$ and $g = 5\%$

We have not considered the effects of diversification benefits (i.e., risk correlations), however, which ERM incorporates into its evaluation of the two potential acquisitions. The impact of the diversification benefits can be seen in the economic capital line of the combined entities. Acquiring Company B would result in a 30% diversification benefit: The economic capital of A + B is 210 compared to 300 before the merger (200 for Company A and 100 for Company B). On the other hand, acquiring Company C would result in a 10% diversification benefit: The economic capital of A + C is 270 compared to 300 before that merger (200 for Company A and 100 for Company C). As such, the acquisition of Company B would actually result in a higher RAROC and a higher M/B ratio for the combined company.

As we have seen, risk management can inform strategic planning for organic growth as well as for growth by M&A activity. The key is setting a clear risk appetite using quantitative measures such as economic capital and RAROC and then evaluating each initiative in terms of how it may affect shareholder value. In this way, companies can limit the downside risks of its endeavors while expanding upside opportunities.

Risk Transfer

Relative to its strategic risk profile and risk appetite, a company may find risk exposures resulting from its M&A activities or core operations that are considered too concentrated or inefficient to retain. Risk transfer may be the appropriate solution.

Traditionally, risk transfer has been viewed by companies as a way to solve specific micro-risk issues. There are generally two reasons behind a firm's rationale for implementing risk transfers: (1) either the firm's exposures are too excessive and they need to shed risk, or (2) it is more financially efficient for that risk to be taken on by a third party, such as a hedge fund or insurance provider. Within a company, for example, the treasurer may use financial futures and swaps to hedge interest rate and foreign exchange risk exposures, while the insurance manager might purchase product liability and property and casualty insurance to protect against certain business



and operational risks. Both the treasurer and the insurance manager have specific risk problems they seek to address through risk transfer. They will evaluate various proposals from product providers and then make a decision based on the best structure and price.

Even in a risk silo, however, the cost of risk transfer can be greatly reduced when individual positions are grouped into portfolios. For example, the treasurer can reduce hedging costs for interest rate risk by macro-hedging the overall balance sheet as opposed to micro-hedging individual assets and liabilities. Similarly, insurance managers have realized significant premium savings by taking advantage of internal diversification and transferring the residual risks using multiple risk, multiyear insurance policies.

ERM takes diversification a step further by integrating the risk silos into a firm-wide risk portfolio. The benefits of diversification, or internal hedges, can then be maximized by considering the volatility and correlation of all risk exposures. As such, the company can integrate its risk transfer activities and focus on its net risk exposures. Taking an ERM approach to risk transfer produces four key benefits:

- Incorporation of the full impact of diversification and thereby reducing the notional amount of coverage and cost of risk transfer;
- Rationalization of various risk transfer strategies to avoid the over- and underhedging of different risks;
- Optimization of the limits and attachment points for insurance/reinsurance policies as well as for the hedging structures for derivative transactions; and
- Minimization of the cost of risk transfer by arbitraging between traditional and alternative risk transfer products as well as between product providers.

The economic capital and RAROC methodology for risk-based pricing is also a useful tool for evaluating the impact of different risk transfer strategies. For example, the economic benefits of executing any risk transfer strategy include lower expected losses and reduced loss volatility, and the economic costs include insurance premium or hedging costs as well as higher counterparty credit and operational risk exposures. In a sense, the company is ceding both risk and return, resulting in a ceded RAROC. By comparing the ceded RAROCs of various risk transfer strategies, a company can compare different structures, prices, and counterparties on an apples-to-apples basis and select the optimal transactions.

Ceded RAROC is calculated by dividing the incremental change in return by the incremental change in economic capital. In essence, it represents the effective cost of risk transfer. If the ceded RAROC is less than the cost of equity capital (K_e), then the risk transfer creates shareholder value. Conversely, if the ceded RAROC is more than K_e , then the risk transfer is destroying shareholder value.

Scenario Analysis

Another useful strategic risk management tool is scenario analysis. A scenario analysis is a top-down, "what-if" analysis that measures the impact that a certain event (or combination of events) will have on the enterprise. An example of a scenario analysis would be to assess the financial impact of a global economic contraction similar to the 2008 financial crisis. In addition



to economic or market scenarios, a company can consider key regulatory, consumer, and technological trends that may have a significant impact on the future business performance of the company. The Duke Energy case study shows how scenario analysis can inform strategic planning and strategic decisions when industry trends are highly uncertain.

Case Study: Duke Energy

In the late 1990s, the market for electric power went through wrenching changes when states began to deregulate utilities.¹²

At a strategy session in July 2000, Duke Energy identified three possible scenarios for its future business environment:

- Economic Treadmill, in which U.S. economic growth would stagnate at 1% per year;
- Market.com, in which the Internet would revolutionize the relationships between buyers and sellers; and
- Flawed Competition, in which uneven deregulation would continue in the energy industry, causing significant price volatility in different regions.

The timing proved prescient. Duke had appointed its first chief risk officer earlier that year, and the U.S. economy had begun the slide that would burst the Internet bubble.

Duke set early warning signals for each scenario: macroeconomic indicators, regulatory trends, technology changes, environment issues, competitive moves, and patterns of consolidation in the energy industry. It soon became apparent that “Flawed Competition” was the most likely outcome, enabling Duke to take evasive action against potential adverse consequences. Unlike many competitors, Duke scaled back its capacity expansion and concentrated on maximizing returns from its existing portfolio even if that meant shedding assets. Anticipating an oversupply of power generation in Texas in the coming years, Duke sold some new plant projects in the state before construction was complete.

Duke reaped the rewards of its foresight in subsequent years and continues to perform well relative to its competitors.

Ongoing Monitoring and Feedback

The old business adage “what gets measured gets managed” certainly holds true in risk management. To support strategic decisions, a company’s performance management system must integrate key performance indicators (KPIs) and key risk indicators (KRIs). These metrics are different in one crucial respect: While KPIs examine past and ongoing performance, KRIs offer insight into future risks and may even indicate ways to avoid or mitigate them. A key risk indicator for a retailer, for example, might be the number of customer complaints. An increase in this KRI could be an early indication that an operational problem needs to be addressed. Left unresolved, the retailer will likely experience a decline in customer retention, a KPI in this example.

Developing Key Risk Indicators

The development of effective KRIs is a key challenge for most companies. Financial institutions usually have an abundance of credit risk and market risk indicators, but they are challenged in aggregating this data and developing operational risk indicators. On the other hand, nonfinancial institutions may have significant business and quality information derived from balanced scorecard and quality initiatives, but they may experience difficulties in developing

¹² Bernard Wysochi, Jr., “Power Grid: Soft Landing or Hard?” *The Wall Street Journal*, July 7, 2000.



KRIs for financial risk or technology risk. All companies face the challenge of establishing leading indicators that can effectively provide early warnings of potential future losses.

While the development of effective KRIs is a significant challenge, there are some readily available sources from which they can be derived. The sources include:

- **Policies and regulations:** Regulations that govern the business activities of the company, as well as the corporate policies and limits established by management and the board, provide useful compliance KRIs. These KRIs may include risk exposures against limits or compliance with regulatory requirements and standards.
- **Strategies and objectives:** The corporate and business strategies—and their associated performance metrics—established by senior management are another good source. Note that performance metrics are designed to measure expected performance, whereas KRIs should be designed to measure downside risk or volatility of performance.
- **Previous losses and incidents:** Many companies have compiled loss/event databases that capture historical losses and incidents. These databases, or even anecdotal evidence, can provide useful input on which processes or events can cause financial or reputational loss. KRIs can then be derived from this data.
- **Stakeholder requirements:** Beyond regulators, the expectations and requirements of other stakeholders—such as customers, rating agencies, stock analysts, business partners—can help in the development of KRIs based on variables that are important to these key groups.
- **Risk assessments:** Performed by the company, risk assessments—including audit assessments, risk-control self-assessments, and internal control tests—can provide valuable input on the business entities, processes, or risks where KRIs are needed.

Integrated Performance and Risk Monitoring

ERM should focus on mitigating downside risk (i.e., worst-case performance) and also help management optimize overall risk-return trade-offs. An integrated performance and risk monitoring process would include the following steps:

1. Define the business strategy through a set of measurable strategic objectives.
2. Establish KPIs and targets based on expected performance for those strategic objectives.
3. Identify strategic risks that can drive variability in actual performance, for better or worse, through risk assessments.
4. Establish KRIs and risk tolerance levels for those critical risks.
5. Provide integrated reporting and monitoring in support of strategic risk management.

In order to effectively manage strategic risks, these steps must be fully integrated.

Unfortunately, many companies perform steps 1 and 2 through the strategic planning and/or finance functions and then report the results to the executive committee and full board.

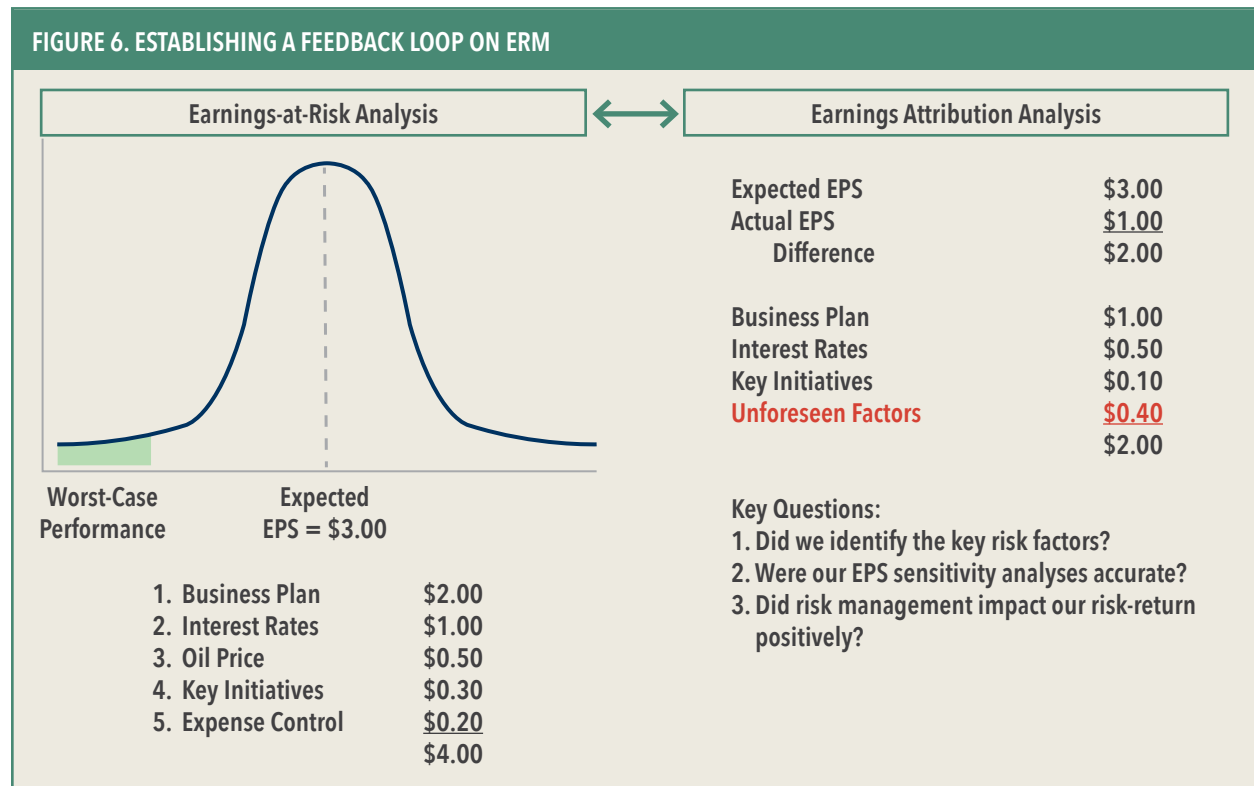
Separately, they perform steps 3 and 4 through the risk function and report those results to the risk and audit committees.



Performance Feedback Loops

A performance feedback loop is a critical concept that supports self-correction and continuous improvement by adjusting a process according to the variances between actual and desired performance. As a foundational component of the scientific method, the feedback loop has long been an essential tool used to support advances in many fields, including economics, engineering, and medicine. More recently, the use of feedback loops has been seen in hedge fund management and effective altruism.¹³ It would be difficult to evaluate and improve any process efficiently without a performance feedback loop. Risk management is no exception!

How do we know if risk management is working effectively? This is perhaps one of the most important questions facing boards, executives, regulators, and risk managers today. The most common practice is to evaluate the effectiveness of risk management based on the achievement of key milestones or the lack of policy violations, losses, or other unexpected events. Yet qualitative milestones or negative proofs should no longer be sufficient. Organizations need to establish performance metrics and feedback loops for risk management. Other corporate and business functions have such measures and feedback loops. For example, business development has sales metrics, customer service has customer satisfaction scores, HR has turnover rates, and so on.



¹³ Bridgewater is one of the largest and most successful hedge funds in the world. The founder, Ray Dalio, argues for the use of a performance feedback loop to monitor and shape organizational effectiveness. See Ray Dalio, Principle #66, *Principles*, 2011, www.bwater.com. Effective altruism is a new, evidence-based approach to charitable giving. The cofounder, William MacAskill, advocates the use of objective feedback loops to determine the effectiveness of altruistic pursuits. See William MacAskill, *Doing Good Better*, Gotham Books, 2015.



In order to establish a performance feedback loop for ERM, a company must first define its objective in measurable terms. One could define the objective of ERM, for instance, as minimizing unexpected earnings volatility. (Note that the goal is not to minimize absolute levels of risks or earnings volatility, but simply those from unknown sources.)

Once we define the objective, we can create the feedback loop. Figure 6 illustrates the use of earnings volatility analysis as the basis of such a performance feedback loop.

At the beginning of the reporting period, the company performs an earnings-at-risk analysis and identifies several key factors (business targets, interest rates, oil price, etc.) that may result in a \$1 loss per share compared to an expected \$3 earnings per share. At the end of the reporting period, the company performs earnings attribution analysis and determines the actual earnings drivers. The combination of these analyses provides an objective feedback loop on risk management performance. Over time, the organization strives to minimize the earnings impact of unforeseen factors. Bear in mind that this is simply one example. While this may not be the right feedback loop for an individual organization (e.g., a nonprofit), every company should establish some feedback loops for risk management.

Quicker Action, Better Results

One key benefit of strategic risk management is early warning of potential problems. Alarms will sound if an initiative falls behind expectations, giving management the opportunity to redirect the effort, lay off risk, or, if results come in so far below target that nothing can salvage the project, to implement an exit strategy early on. The ability to “fail faster” will do more than almost anything else to improve a company’s financial performance.

Lack of reliable metrics is no longer an obstacle to strategic risk management. Economic capital is a common currency in which any risk can be quantified, and the RAROC calculated in various scenarios allows management to determine which business activities will maximize shareholder value.

Although strategic risks pose the greatest threat to most companies, few have yet to incorporate strategic risk management into their ERM program. Strategic initiatives always involve risk, and some will not pan out as expected no matter how carefully planned. Companies that manage strategic risk skew the overall risk-return profile in their favor. They can ramp up initiatives that exceed expectations and spot potential losers in time to take corrective action before significant losses accumulate. Risk management should improve the percentage of successful initiatives as well as create a strategic risk profile similar to a call option, with its limited downside risk and unlimited upside potential.