Risk in review

Coping with the unknown: risk management strategies for an uncertain world

Risk in review series

August 2012

pwc

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The heart of the matter

Risk management innovation in action

Building new risk management capabilities is always a challenge, but in 2012, companies must innovate while simultaneously facing a barrage of emerging external risks.

This period of heightened volatility, which started with the 2008–2009 financial crisis, shows no sign of ending soon. The Eurozone debt crisis continues to cast a shadow over the world economy, and levels of consumer and corporate indebtedness remain well above historical averages in many countries. At the same time, the US is grappling with an appropriate response to the expiration of the Bush tax cuts at year-end 2012 and mandated budget cuts in 2013.

Shifts in business strategies and organizational structures are also making firms more vulnerable to external risks. The pace of technological change has spawned new business models as well as new threats, while globalization has led companies to expand their operations into frontier markets where geopolitical, economic, and environmental risks can be high. These shifts have led companies to move from rigid organizational structures to extended enterprises with intricate linkages to suppliers, customers, and partners—providing greater flexibility, but also exposing them to greater risks.

In recent years, many companies, especially those with well-developed enterprise risk management (ERM) programs, have grown more adept at managing known risks, which are defined as risks that can be identified and planned for in advance. But most risk management systems fall short on managing emerging risks—those that are on the radar but whose full extent and impact remain unknown—as well as "black swan" events, which hit with no warning but potentially large impact. According to a recent study commissioned by the Association of Insurance and Risk Managers (Airmic), these types of unknown risks can "pose a potentially lethal threat to the future of even the largest and most successful businesses" and often "cause serious, sometimes devastating and almost always uninsurable losses to the business, its reputation and its owners."[1]

This report focuses on the critical challenge of coping with these unknown risks. The first section reviews the risks named as those of greatest concern to our survey and interview participants (see "Study methodology," page 20). The second section discusses tools and techniques companies are using to deal with rising volatility. The third section presents five risk management strategies that firms appear to be deploying effectively—subject to the caveat that the art of risk management is still very much a work in progress.

Most risk management systems fall short on managing emerging risks, as well as "black swan" events, which hit with no warning but potentially large impact.

1 Cass Business School / Airmic, *Roads to Ruin: A Study of Major Risks Events—Their Origins, Impact and Implications* (2011).

An in-depth discussion

Tools for managing top risks

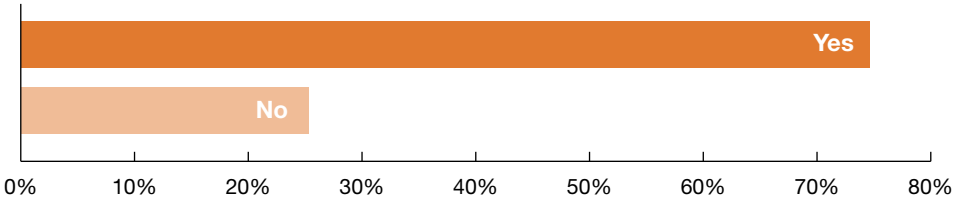
The risks of greatest concern

External risks

Companies have grown more proficient at managing internal risks for which historical loss data are abundant. Indeed, about three quarters of the respondents to PwC's *Risk in Review* survey indicate they currently have an ERM program in place that helps them identify and manage a range of risks.

But these ERM systems are less effective in dealing with unknown external threats, such as those arising from geopolitical events, economic developments, new technologies, talent, global trade, commodity costs, and terrorism. According to our survey, over 50% of companies feel they are not doing a good job of managing these risks.

Figure 1: Most surveyed firms have an ERM program in operation



Source: PwC

According to our survey, over 50% of companies feel they are not doing a good job of managing external risks.

Figure 2: The most critical external risks

	Total	Financial services	Industrial products*	TICE**	Health services	Retail and consumer
Economic uncertainty	76.3%	83.1%	76.4%	73.2%	67.0%	75.5%
Financial market	59.9%	80.7%	61.6%	43.3%	37.1%	50.0%
Regulations and government policies	62.1%	77.3%	58.9%	44.9%	70.9%	49.1%
Geopolitical	30.8%	36.4%	33.0%	25.0%	28.4%	25.0%
Energy and commodity costs / prices	39.3%	20.9%	66.1%	16.9%	17.2%	49.1%
International trade and payments	20.7%	21.1%	24.9%	16.8%	9.5%	21.4%
Crime and terrorism	16.0%	17.1%	18.7%	11.5%	13.5%	13.4%
Commercial market shifts	54.2%	55.6%	51.7%	63.2%	51.0%	51.9%
Disruptive technologies	40.6%	45.5%	28.5%	60.0%	44.0%	34.3%
Data privacy and security	56.3%	64.2%	44.9%	60.0%	64.9%	54.4%
Competition	62.8%	61.3%	54.6%	74.6%	58.1%	77.2%
Talent and labor	57.5%	58.3%	55.6%	57.6%	51.4%	65.1%

*Industrial products includes the automotive and energy sectors, as well as utilities
**Technology, infocom, and entertainment
Note: Shading indicates the sector(s) with the greatest exposure to each risk.
Source: PwC

Unfortunately, as Figure 2 shows, these will be among the greatest risks facing companies over the next 18 months. The sector with the greatest exposure to each risk is shaded. Financial services leads all other sectors in the number of external threats expected to be at "high risk" levels over the next 18 months, as banking, insurance, and capital markets firms seek to address economic and financial market volatility as well as an ongoing regulatory and political backlash against the financial sector.

While all firms in our survey voiced concern over external dangers, the intensity can vary by industry. For example, firms in the retail, consumer, technology, media, and entertainment sectors are particularly nervous about competitive risks, while companies in the financial and health sectors are understandably more worried about data privacy and security.

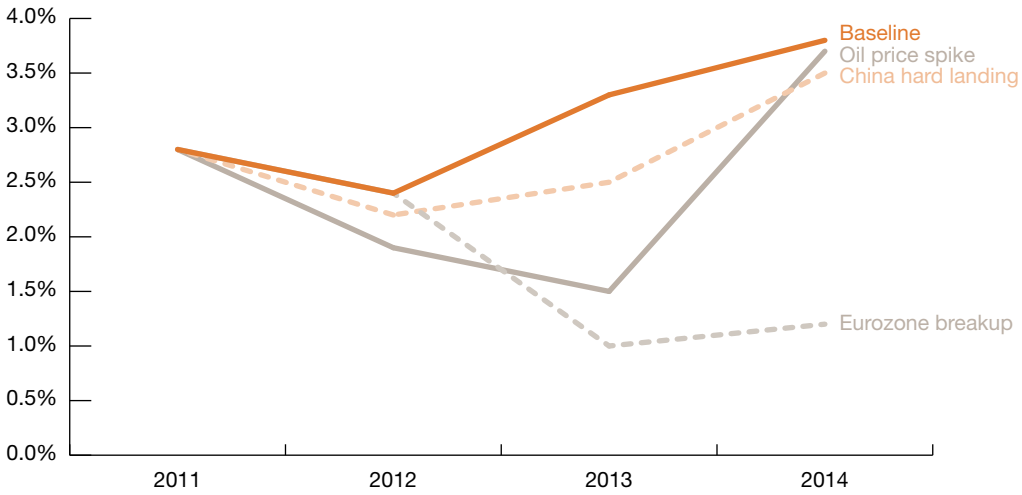
External risks originate from outside the corporate organization—from disruptions in geopolitical, economic, regulatory, market, technological, or environmental conditions. Because these risks arise from outside of the organization, management teams often have not developed the expertise to monitor and manage them effectively.

Corporate boards and senior management teams are now starting to pay greater attention to these risks, due to their potential severity. For instance, John Sibson, Vice President for Corporate Strategy at Johnson Controls, says his most recent risk briefing to the board covered a number of external risks, including those relating to the Eurozone crisis, technology breakthroughs, commodity availability, and geopolitical and regulatory trends. (See "Case study: Coping with the unknown at Johnson Controls," page 12.) Microsoft's Chief Operating Officer, Kevin Turner, is also watching the Eurozone, noting that his company has implemented a separate forecasting process for countries in Europe, the Middle East, and Africa specifically to answer the question, "Which country will be the next Greece?" Perhaps unsurprisingly, over three quarters of our survey respondents consider economic risk to be the risk of highest concern over the next 18 months.

At present, Oxford Economics' risk scenarios suggest that the most severe economic peril is a Eurozone breakup, which would likely push the global economy back into recession. Other current risks include a "hard landing" for high-flying Chinese growth rates, or an oil price spike to $200/barrel, perhaps related to tensions with Iran (see Figure 3). While a Eurozone breakup is currently the greatest threat to the global economy, modeling by Oxford Economics suggests that for the US economy, the negative impact of an oil price shock would also be significant.

Figure 3: Oxford Economics risk scenarios

Global economic growth, 2011—2014
Baseline forecast and current economic risk scenarios



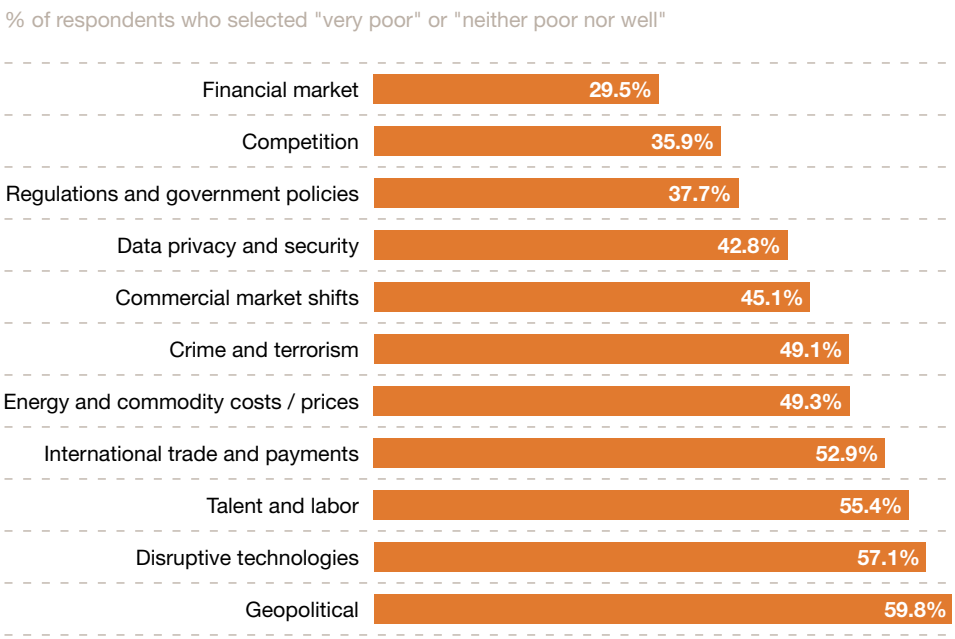
Source: Oxford Economics

Economic volatility, climate change, growing populations, and globalization appear to be increasing the frequency of black swans.

Emerging risks

Emerging risks are another key area of current concern. These appear on the corporate radar but unfold in hard-to-predict ways. Because emerging risks are by their nature uncharted, they can be difficult to assess and manage. Technology developments can be particularly perplexing: Not only do they often arise from unprecedented scientific advances, but their market acceptance is largely unknown. Not surprisingly, 57% of executives surveyed rated their firms' management of risks arising from disruptive technologies as very poor or "neither poor nor well" (see Figure 4).

Figure 4: The worst-managed risks



Source: PwC

Microsoft COO Kevin Turner identifies cyber-security and data privacy as his greatest concerns, driven by growing complexity and growing risks in emerging markets in Asia and Eastern Europe. Peter Evans, Director of Global Strategy and Planning at GE Energy, says cyber-threats are also grabbing attention in his sector. Cyber-risks will continue to grow in the energy industry, according to Evans, because the "next phase of the digital wave will likely bring the social media revolution into heavy industry and big infrastructure."

Scott Greenfield, IT and Project Assurance Leader at PwC, agrees that digital threats are among today's top risks. But he argues that two aspects of the issue that generate significant risk are often downplayed or misunderstood.

First, firms tend to focus on external threats, rather than looking at internal risk sources. This is an important blind spot because, although the exposure is similar, the vulnerabilities that an internal hacker can draw on—in terms of access points and relationships—are very different than for external cyber-risks.

Second, firms tend to overlook social media threats. A few years ago, it was not uncommon to find major firms among the US Fortune 500 that had no formal policy governing employee engagement with social media. This situation is less common today, but many firms are still playing catch-up. Indeed, one of the senior executive participants in our survey noted that it was still unclear how social media risks ought to be classified within his company's ERM universe.

Brown, US Risk Assurance Innovation Center Leader at PwC, believes executives should draw a distinction between risks whose probability can be estimated and uncertainties for which the probabilities associated with each level of impact are unknown.

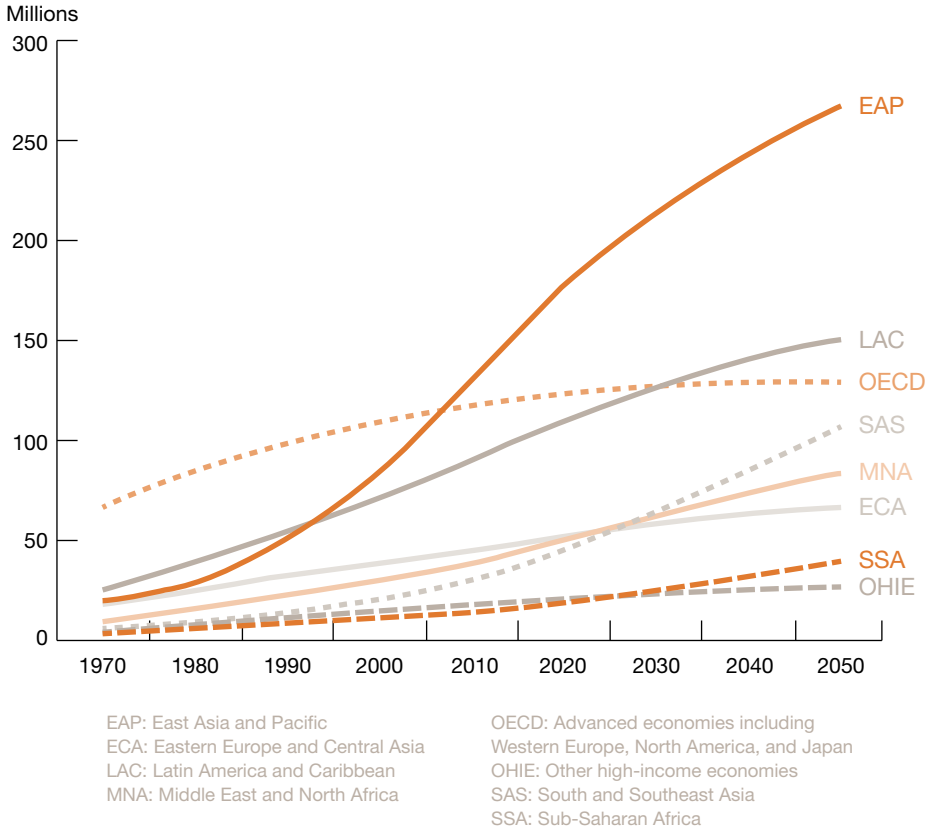
The apparent increase in the frequency of black swans may reflect increasing levels of exposure, and not simply a more risky environment. For instance, GE Energy's Peter Evans argues that the biggest trigger behind the rise in extreme risk events is the expansion of the human-built environment. The number of recorded major natural disasters doubled between 1985 and 2005, from about 200 to 400 per year. This jump occurred not simply because there are more catastrophes or that these events are better-recorded, but because the human-built environment covers significantly more of the earth's surface today than it did even 20 years ago.

> "You have to match the tools to the problem, and there's rarely one tool that fits all the problems."
>
> *—Peter Evans, Director of Global Strategy and Planning, GE Energy*

Black swans

There has been a surge of extreme and unexpected risk events over the past few years, including the Arab Spring; the March 11, 2011 Japanese tsunami that caused the Fukushima nuclear disaster as well as tragic loss of life; and the eruption of Iceland's Eyjafjallajökull volcano in April 2010, which shut down transatlantic and European air travel. These threats—often referred to as black swans (a term coined by Nassim Nicholas Taleb)—are nearly impossible to predict and can have catastrophic consequences. Brian

Figure 5: Total global population exposed to earthquakes, 1970–2050 (in millions)



Source: World Bank

In a similar vein, says Mr. Evans, "the global spans of enterprises have grown," exposing firms to more risks. Corporations have increasingly become extended enterprises built around intricate linkages to suppliers, customers, and partners. With value chain segments such as transport, customer relations, warehousing, and information technology increasingly outsourced to third parties, firms are better able to focus on their unique core strengths. However, firms may also struggle to coordinate effective responses to crises, because they must rely on partner organizations over which they have no direct control. In addition, risks may arise from partner organizations that have weaker standards of risk governance.

A recent example is a manufacturing company that had applied standard sourcing practices and spread its sourcing for a key part among three suppliers. Unfortunately, all three suppliers were required to rely upon the same company for a single critical component. This second-tier supplier was located in the region hardest hit by the Japanese tsunami, leading to a severe supply chain disruption. To identify this risk, it would have been necessary for the manufacturing company to consider its suppliers' suppliers for components that were critical to the company's continued operations. "It's crucial to understand deep into your supply chain, and where the concentrations are, because these can be weak points," says PwC's Brian Brown.

Tools to manage the unknown

Designed to thwart the types of internal threats that struck companies such as Enron, most ERM systems do not have the ability to identify external shocks and their impacts on the organization. Sophisticated ERM processes and systems can aggregate data from across an enterprise to identify the most important risks for a company as a whole. But as Christopher Michaelson, Director of Global Advisory Strategy and Risk at PwC, notes, "External risks are often not easy to measure, and over-reliance on measurable data just because it happens to be available is something that you want to avoid."

To address emerging risks and black swans, companies must look to new tools for understanding vulnerabilities and becoming more resilient. "You have to match the tools to the problem, and there's rarely one tool that fits all the problems," says GE Energy's Peter Evans. PwC's IT and Project Assurance Leader Scott Greenfield argues that the key challenge is not finding the perfect tool, but adapting a suite of tools effectively to the industry's particular business processes, as these often determine a firm's specific areas of vulnerability.

The techniques and strategies that are being developed can be classified into three basic categories: those for identifying and tracking risks, those for analyzing and forecasting risks, and those for responding to risks and building resilience.

Identifying and tracking risks

Among the most important tools in the risk leader's arsenal are horizon scanning and early-warning capabilities, which can enable the identification and tracking of emerging risks. According to Peter Evans, "To be successful in business, you have to be very good at scanning the external environment."

This kind of horizon scanning needs to be part of an ongoing process. "Everybody does their due diligence before they enter a market, but few do ongoing due diligence in the volatile markets they operate in," says PwC's Christopher Michaelson. To fill this gap, Microsoft's Kevin Turner says his company has adopted a "command center" approach in which risk leaders meet quarterly to address threats that go beyond ERM, using scenario planning.

Case study: Coping with the unknown at Johnson Controls

For Johnson Controls, the journey toward a risk management approach capable of dealing with the unknown began in 2007, when a team of executives was assigned a project to address the topic of enterprise risk management. The team came up with an unorthodox recommendation: Place responsibility for ERM within the strategy planning function. This recommendation was supported by Corporate Executive Board research, which found that between 1988 and 2002, 65% of major share price declines at Fortune 1000 firms were caused by strategic factors.

Johnson Controls' decision to integrate ERM into strategy planning means that timelines and processes for strategic planning and risk mapping are integrated. Moreover, the firm's strategic plan includes the risks associated with each strategic initiative. "This is an emerging good practice, to see risk and strategy as part and parcel of each other, rather than something that gets managed after the strategy is already set," notes PwC's Christopher Michaelson.

However, John Sibson, Johnson Controls' Vice President for Corporate Strategy, estimates that to date only 10% of Fortune 500 firms have actually placed ERM responsibility within strategic planning. The vast majority of firms continue to assign ERM roles to internal audit or treasury.

Johnson Controls uses a relatively orthodox ERM framework, with a risk universe populated by about 100 threats, updated yearly and rated by senior business unit and corporate staff. The standard likelihood and impact ratings have been extended via inclusion of ratings for risk management effectiveness and risk velocity (ranging from hours to more than a year). Top risks identified by this rating process are then reviewed and adjusted in leadership workshops.

The company has developed an automated tool that allows managers to click to assign ratings for each risk, on a one-to-five scale. The risks are categorized into external, strategic, operational, people, financial, and legal/compliance risk categories. The operational category currently contains the largest number of risks.

The Enterprise Risk Committee synthesizes risk input from this tool and a variety of other sources (including internal audit, corporate compliance, and insurance) to redirect focus where required. The committee also dedicates time at every meeting to a discussion of emerging risks.

Based on Corporate Executive Board recommendations, organizational aspects of the process were updated in 2009 to provide a vehicle to monitor emerging risks throughout the year, and to introduce a way to formalize the corporate risk appetite and communicate top risks to the board. Internal audit has also taken on the role of evaluating the validity of the risk management effectiveness ratings for key risks.

According to John Sibson, the company's approach has enabled its ERM program to address strategic threats effectively. In 2008, top risks were challenges associated with rapid corporate growth, such as people issues and innovation. In 2009, risks relating to liquidity and access to capital rose to the top. In 2010, people risks were back in the global top ten list, and in 2011 supply chain threats were among the top five risks. Risks remaining near the top of the list since 2008 include technology breakthroughs, competition, and innovation.

This year, as a result of this threat analysis process, the firm initiated a strategic program to grapple with potential threats arising from innovation in battery technology. "What kills companies is not vertical threats from within the sector, but horizontal threats from new entrants and substitute products," says Mr. Sibson. This is what makes it important to have an ERM program capable of addressing strategic challenges effectively.

Approaches to horizon scanning vary, but early-warning indicators are increasingly popular. John Sibson says the automated ERM system at Johnson Controls reveals how risk perceptions are trending. (See "Case study: Coping with the unknown at Johnson Controls," page 12.) However, Richard Sykes, Partner and UK GRC Leader at PwC, warns that "Relatively few companies use forward-looking indicators effectively, because they haven't needed to do so traditionally." Scott Greenfield believes that risk management functions will also need to evolve to support these new capabilities: "Many internal audit groups, and other risk and compliance functions, need to become more data-focused and predictive."

According to John Krum, Group Vice President and Regional Treasurer at ABB, his company put in place a credit risk early-warning system during the early stages of the global financial crisis, providing risk signals that are updated daily. The system tracks credit default swap prices for ABB's key counterparties and compares these with prices for other firms with similar credit ratings, flagging discrepancies as an early warning of potential downgrades or emerging credit risk situations.

Forecasting and analyzing risks

Scenario planning is a valuable tool for forecasting in times of uncertainty, since the technique shows the impact of alternative assumptions, rather than attempting to provide one precise forecast. Simulation models can be used to assess the performance of corporate strategies under different scenarios stemming from economic trends, political outcomes, and other market developments.

Scenario planning has also become a crucial tool for risk managers. "Scenario planning is integrated into all aspects of our business," notes Microsoft's Kevin Turner. Financial institutions use tools such as global macroeconomic models for scenario planning, to produce quantitative evaluations of the impacts of external risks on key financial and market indicators.

At the economic research firm Oxford Economics, scenario planning is undertaken via a monthly meeting of the senior forecast team, during which they discuss the firm's central forecast in light of the latest data and news. "For example," says Scott Livermore, the firm's Director of Industry and Macroeconomic Forecasting, "how have the latest developments in the Eurozone crisis affected our thinking about global economic growth?" While Oxford Economics' views on the impacts and transmission channels of a breakup have not changed, the probability has fluctuated.

Given today's risky global environment, there is a tendency to focus only on the downside of unexpected events. But external shifts can also yield opportunities for alert companies. As Kevin Turner notes, "Scenario planning for success is just as important as scenario planning for risk." For instance, a company must plan for product launches that may go better than expected, or such opportunities will be missed. Oxford Economics' Scott Livermore says that "We're now reviewing the possibility of a corporate investment surge based on the fact that companies in the US and UK are running large cash balances." If these cash balances were to be invested, global GDP could surge to close to 5% in 2013 and 2014.

Given today's risky global environment, there is a tendency to focus only on the downside of unexpected events. But external shifts can also yield opportunities for alert firms.

As one example of planning for such unexpected upside developments, ABB's John Krum cites the possibility of a surge in business during the credit crisis. The credit crisis has led to a resurgence of traditional ways of financing, and as a result, "trade finance is going to be a big focus" for ABB. The company is putting in place plans that enable it to manage a surge in business even if limited balance sheet resources are available to be applied to trade finance.

Of course, even the most sophisticated risk identification tools may be useless if some risks are truly unpredictable. One of the most popular techniques for analyzing unpredictable risks is "reverse stress testing," which works backward from an assumed consequence. Trying to predict black swan risks such as the Icelandic ash cloud can be a waste of time, says PwC's Richard Sykes. Rather than trying to think first about potential causes of risks in the external environment, he advises considering "what the consequence is to your organization of not being able to do X." For instance, if air travel is critical to a business, managers should "think about how they would respond to not being able to fly—whether the cause is a volcano, snow at Heathrow, or a public strike."

PwC's Stephen Del Vecchio, the firm's Third Party Assurance Practice Leader, advises a policy he describes as "a single point of failure plus one." This means identifying any single point that could cause a critical failure, adding a redundancy, and then ensuring this redundancy is not in itself a potential single point of failure. The backup generators for a critical plant, for instance, should have two suppliers of fuel so that a single bad fuel delivery could not knock out the company's business continuity capabilities.

This can also entail looking beyond the organization. According to GE Energy's Peter Evans, "You survive in business by making your customers successful." For GE Energy, this means helping customers address the risks they face when using mission-critical GE products. In a similar vein, Stephen Del Vecchio contends that third-party assurance for key business partners is crucial to ensure companies in the "extraprise" also have appropriate governance and controls.

Brian Brown at PwC says that, "To be effective, due diligence must go down a number of layers in a complex network." Today, due diligence must extend beyond the firm into the supply chain. Cutting-edge techniques are being developed to take a systematic approach to this challenge, viewing business networks and systems as complex adaptive systems. In time, these may enable firms to be as confident in understanding and managing the risks originating in the "extraprise" as they are in addressing internal risks today.

"To be effective, due diligence must go down a number of layers in a complex network."

-Brian Brown, PwC principal and leader of Risk Assurance Innovation in the US

Case study: Simulating a black swan

If some risks are truly black swans, and by definition unpredictable, then companies may want to focus their risk management efforts on greater resilience. One way to test and develop resilience is via simulations.

One UK firm recently decided to conduct an elaborate scenario planning exercise, facilitated at an off-site location and involving individuals playing their corporate roles over a simulated three-week period. The scenario was total loss of contact with the company's Chinese operations. This was simulated intensively, with Twitter and BBC News feeds that made the situation seem real. "People were grabbed outside their offices and a microphone was stuck under their nose as they were asked, 'What are you going to do about this?'" recounts Richard Sykes of PwC.

The company already had strong risk management processes and systems in place, but the simulation provided an opportunity to test and develop its capability to respond to an unexpected crisis. The exercise yielded two main findings.

First, the role of social media in today's environment means one of the biggest challenges is time. "Today, chances are the group knows about a crisis at exactly the same time as the media," Mr. Sykes points out. "That makes the consistency of communication across a firm vitally important, including clear responsibilities for communicating to the media."

Second, integrated information systems are critical: Even by the middle of the second simulated week, the firm was unable to say who the suppliers of its suppliers in China were. Because of the time pressure in a crisis, the ability to develop a complete global picture in near real-time is crucial.

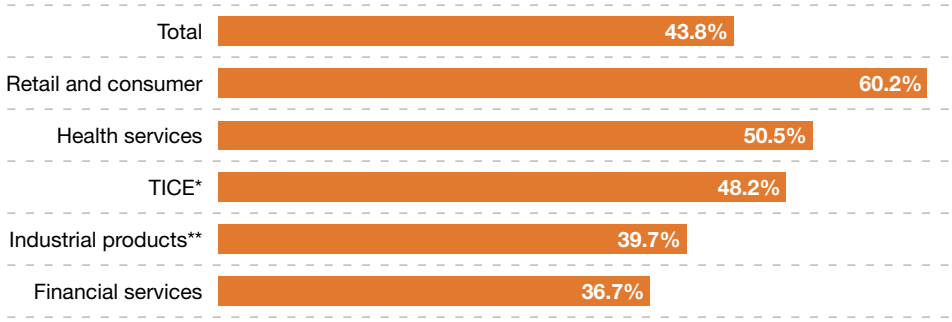
Building resiliency

Even with the most advanced monitoring and forecasting tools, it is difficult to accurately identify what external risks may arise, and to assess their impact on your business. For that reason, many pragmatic executives focus their energy not on detecting but on responding to risk. "Where companies fall down is in responding to the event itself," notes PwC's Stephen Del Vecchio. "Any company with a well-developed ERM system should be able to identify risks and plan for alternate scenarios. But actually producing a well-coordinated, firm-level response to an event is more difficult."

Mr. Del Vecchio takes the example of counterparty risk, noting that most firms can identify this risk, but find it difficult to measure their exposure. "Because most firms have complex global relationships, when an event like the Lehman Brothers collapse happens, it may be very challenging to assess the full impact on the organization."

Figure 6: Strategic planning often excludes risk management

How effectively is risk management integrated into the strategic planning process within your orgnaization?
% of respondents who selected "very poorly," "poorly," or "neither poorly or well"



*Technology, infocom, and entertainment
**Industrial products includes the automotive and energy sectors, as well as utilities
Source: PwC

One firm that is actively building risk resilience into its organization through better process and training is ABB. Since political upheavals, natural disasters, and terrorism can be hard to predict, the company has focused instead on developing new response capabilities, such as a system that tracks its employees globally and can provide travelers and management with intelligence on risks and dangerous situations as they occur. "By the end of 2011," ABB notes on its website, "about 850 managers in all eight regions, as well as almost all country management teams, had been trained on crisis management with workshops and exercises." In Japan, for instance, the exercise for managers had fortuitously centered on the scenario of a major earthquake, shortly before the March 11, 2011 earthquake and tsunami.

Data privacy risks are another threat that some firms are attempting to address through organizational resilience. Many firms have been built up through acquisition, and use different systems and varying governance structures. As a result, such companies will often have good disaster recovery plans, but they may not know what data they capture, where key data are located, who has access, and how data are managed. PwC's Stephen Del Vecchio says the goal should be to take "management of risk events to the same level of confidence as with day-to-day business management." Firms are hacked every day, he notes; best-in-class firms assume risk events will happen and plan to respond effectively rather than thinking, unrealistically, that risks can be eliminated. One way to test response capabilities is through simulations. (See "Case study: Simulating a black swan," page 16.)

ABB's John Krum says that good risk governance is essential to enabling this kind of effective response: "We have credit risk we must manage, so we have beefed up our functional organization at the center," bringing together division CFOs, regional managers, and key account managers into a group credit committee.

Aligning risk and strategy can help firms evaluate vulnerabilities more accurately. Risks are inherent in any business strategy, and therefore they should be managed together at senior levels. "Just as strategy execution is folded into executive meetings at regular intervals, it is crucial to do the same with risk management execution, through a company's regular operating mechanisms," says PwC's Brian Brown. Unfortunately, many firms—particularly those in changing industries like health services, retail, and technology—report that they have not done a good job at aligning risk and strategy (see Figure 6).

What this means for your business

Five emerging strategies for coping with the unknown

Leading organizations adopt a range of practices to cope with the unknown, from horizon scanning to scenario planning to third-party assurance. Some focus on developing a view beyond their sector, investing in tools and analyst teams to identify emerging and external risks. Others assume many risks are simply unpredictable, and focus on developing capabilities to manage the consequences. Five top strategies emerged during our executive interviews.

1. Use "reverse stress-testing" to identify vulnerabilities.

Banking regulators in particular have embraced reverse stress-testing as a way to understand an organization's level of resilience. Rather than running a typical stress-testing scenario such as a "once-in-10-year recession," the bank starts from a failure scenario and works backward to see how serious a recession would have to be to cause that outcome. In a similar vein, nonbank firms are focusing on identifying their vulnerabilities, recognizing that some causes of risk are simply unpredictable.

2. Manage crises as if they occur every day.

"Business continuity planning goes beyond IT, to looking at people and supply chains on an end-to-end basis," notes PwC's Dean Simone, Risk Assurance Services Leader. Firms should recognize that unpredicted risk events will happen, and they must go beyond a disaster recovery mindset to ensure they can manage these events and assure business continuity while maintaining stakeholder confidence. For some types of risk, this entails building "buffers" that provide the breathing space needed to absorb shocks and mount a considered response to crises. These buffers can include liquid assets on the balance sheet and diversification to avoid over-concentration of risk.

3. Enable a company-wide response to emerging threats.

Threats on a scale that could imperil a firm's viability tend to require firm-wide responses. As a current example, Dean Simone explains that while most firms are well aware of risk in the Eurozone, responding effectively to the possibility of a Eurozone breakup might require companies to employ an integrated cash-pooling system to know where their money is in Europe on a day-to-day basis. Responding to actual risk events often requires firm-wide integration of financial and IT systems.

Strategic risks—those that most often imperil a firm's survival—are usually embedded within particular corporate strategies. Therefore, integration of strategy and risk is necessary to manage these risks effectively.

4. Integrate risk management and strategic planning.

Mr. Simone observes, "One mistake businesses make is that their executives debate their strategy, and then a week later someone else is talking about risk." Strategic risks—those that most often imperil a firm's survival—are usually embedded within particular corporate strategies. Therefore, integration of strategy and risk is necessary to manage these risks effectively. Situating ERM responsibility within the strategy group, as Johnson Controls has done, may be an emerging best practice.

5. Do not focus exclusively on the downside of risk events.

Firms must plan effectively for unexpected success, such as providing for better-than-expected product launches, or developing innovative ways to provide finance to reach new customers. "Too often, companies play to avoid failures rather than playing to win," states Microsoft's Kevin Turner.

Riding the wave of risk management innovation

These five strategies are not intended to be comprehensive but provide a snapshot of the risk management revolution in progress. The wide range of techniques and approaches firms are using to address unknown risks is an indication that this wave of risk management innovation is still ongoing. It is clear, however, that today's era of volatility is here to stay for the foreseeable future. So coping with unknown risks and uncertainty will be an imperative for ensuring a company's continued success.

Study methodology

This study is based on interviews with senior executives of Fortune 500 companies and PwC subject-matter experts, carried out in May 2012, and the results from a survey of more than 1,000 executives and risk management leaders with businesses worldwide, carried out in November 2011. The executives we interviewed were based in Europe and North America. The survey sample covered a broad range of companies, with 60% based in the United States and the remainder overseas. Participants were approximately evenly distributed between companies with annual revenues of less than $1 billion, between $1 billion and $5 billion, and more than $5 billion. Oxford Economics worked with PwC to help produce this report.

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To have a deeper conversation about how this subject may affect your business, please contact:

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