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Climate Negotiations Pass Milestone on Insurance

By Dr. Koko Warner

GOOD CHANCES for insurance solutions to be part of the UN-Climate Conference in Copenhagen 2009

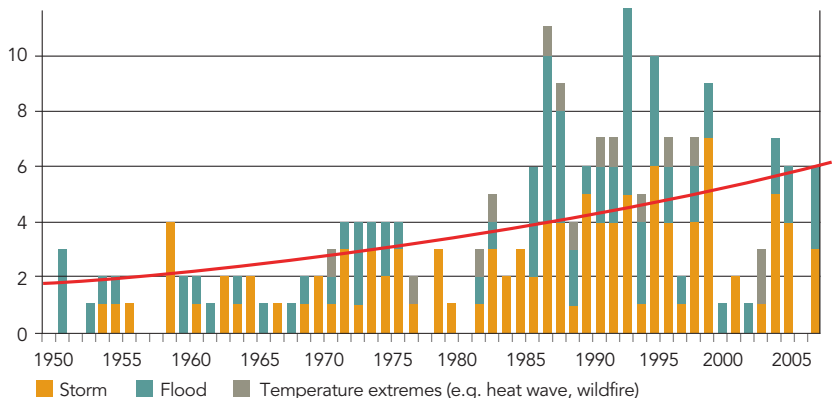
Insurance has been included into the interim negotiating text for the climate summit 2009 in Copenhagen at the climate negotiations this week in Bonn. This is a critical juncture to build insurance mechanisms into the architecture of the agreement that will emerge in Copenhagen this year.

EXTREME WEATHER EVENTS ON THE RISE IMPACTING DEVELOPING COUNTRIES THE MOST

Weather-related risks play an important role for the insurance sector. Climate change changes the probability of weather-related extreme events, often increasing the frequency and/or intensity of such events. According to the 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2007), human-induced climate change trends will continue to have a major influence on weather-related risks. Increasing hazard frequency and intensity cycles, probably associated in part with an underlying climate change trend, increase the potential for losses. The insurance sector will need to quantify this emerging trend where applicable and include the findings into its risk calculations, pricing and underwriting (Charpentier 2008).

Economic losses from weather-related natural hazards are rising, averaging roughly US\$100 billion per annum in the last decade (MunichRe 2007). The losses in value and productive capacity are the highest in developing countries. The need for risk management tools such as insurance is growing in these areas at a time of mounting climate-related and other risks. By providing financial security against droughts, floods, tropical cyclones and other forms of weather variability and extremes, insurance instruments present an opportunity for adapting to climate change (Hoepe and Gurenko 2006).

Figure 1: Great Weather Disasters 1950–2007



Thus a dual challenge, and opportunity, faces the insurance sector and society. First, most of the factors related to increasing losses are not climate-related, but societal in origin, thus increasing the need for effective and integrated risk management and risk reduction (Ward et al. 2008, Maynard 2008). Risk reduction efforts, if effective, can help maintain insurability as the proportion of risk attributable to climate change rises through time (Bals et al. 2006). Second, there is a need and a market niche to develop insurance solutions for areas facing increasingly frequent and intense weather-related hazards (Dlugolecki et al. 2009, Mills 2007).

CLIMATE NEGOTIATIONS PASS MILESTONE ON INSURANCE

An important milestone was passed at the April Climate Talks in Bonn, Germany. The secretariat to the climate negotiations, the UNFCCC, issued a “focus paper” as a foundation upon which negotiators will build the elements of the negotiating text heading into Copenhagen. That paper laid out the crucial points for establishing insurance in the Copenhagen treaty:



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- First, a risk management framework that includes insurance. Risk reduction and insurance are areas of broad Party consensus.
- Second, the paper calls for a specialized financial mechanism and dedicated multilateral funds for adaptation. This includes any financial support that may be needed to support elements of a new mechanism for insurance. Institutional arrangements to enable financing for adaptation would include a political framework and dedicated committee.

Thus insurance will not merely appear as a keyword in the Copenhagen agreement, but will see concrete funding and operational considerations put into it. Christoph Bals, vice chairman of MCII and executive director of the NGO Germanwatch expects that “the climate negotiations will, by the end of 2009, create an adaptation framework with risk management—of which insurance solutions targeting the most vulnerable in developing countries will be part.”

INSURANCE PROPOSALS AT THE CLIMATE NEGOTIATIONS

At the 2008 climate talks in Poznan and again in April in Bonn, negotiators stressed the need for risk management, including insurance as an element of risk management, in the architecture of the Copenhagen Agreed Outcome (UNFCCC 2008a, 2008b). Numerous proposals have been put forward during the climate negotiations that mention insurance.¹ Two detailed insurance-related proposals were tabled by the Association of Small Island States (AOSIS) and the Munich Climate Insurance Initiative (MCII). The two proposals explore how risk management including insurance mechanisms could fit into a longer-term adaptation financing framework (i.e., post-2012) (AOSIS 2008, MCII 2008). Both proposals emphasize that risk prevention and risk reduction are the points of departure for managing climate-related disasters. When effective risk reduction is in place, insurance can be a complementary measure to facilitate adaptation.

Dr. Koko Warner, who leads a department at the United Nations University, noted: “All parties agree that the best starting point to address climate change is reducing risk. They look to the insurance sector for its expertise, and are looking for ways to engage the sector more actively—from risk modeling and pricing to the provision of insurance services.”

The AOSIS proposal asked the climate negotiators to create a multi-window mechanism with three components to address loss and damage from climate change impacts: insurance, compensation for loss and damage from progressive cumulative adverse impacts such as sea level rise and risk management. While the AOSIS proposal does not detail where that technical advice might come from, the insurance sector would likely be involved in such activities if it were part of the Copenhagen Agreed Outcome.

The MCII provides more detail on the insurance elements in a larger UNFCCC framework of risk management. Low-level risks are often effectively addressed by risk reduction and prevention measures. The estimated cost of the prevention pillar is \$3 billion per year. Risks at the medium and high level can be addressed by insurance measures that complement and incentivize risk reduction and prevention. MCII’s proposal envisions two parts in the insurance pillar: a Climate Insurance Facility and a Climate Insurance Pool (CIP).

The Climate Insurance Facility would catalyze nascent risk sharing and risk transfer systems including microinsurance at the medium level of risk. For middle level risks, a Climate Insurance Assistance Facility could create the necessary framework for insurance—especially microinsurance but also social safety nets and similar tools—to help the vulnerable adapt to climate change. Such a facility could provide support for data collection, necessary infrastructure and activities that lower transaction costs and stabilize the system. It is also possible that such a facility could pool medium level risks and reinsure small

FOOTNOTES:

¹ Most recently proposals have come from countries like Switzerland, Mexico, some countries of the European Union and further ideas from Bangladesh (for the LDCs), China, India, Argentina, the Philippines, Malaysia, Saudi Arabia and other countries, and from observers like Munich Climate Insurance Initiative (MCII), the Climate Adaptation Network (CAN), and others.

“Climate negotiations will create an adaptation framework with risk management—of which insurance solutions targeting the most vulnerable in developing countries will be part.”

insurance schemes. Generally the risk part of the premium should not be subsidized; however, it should be possible for premiums to be paid “in-kind”: The vulnerable that receive insurance coverage could contribute to premium payments by contributing work time to reduce risk locally. The estimated cost for a Climate Insurance Assistance Facility is \$2 billion per year.



For very large risks such as 100-year or greater weather hazards that go beyond national coping mechanisms in vulnerable countries, MCII proposes a CIP to absorb a pre-defined proportion of disaster losses, at no cost to the beneficiary developing countries. The CIP will be reinsured against extreme loss years in the global reinsurance market. The estimated cost for the CIP including reinsurance is estimated to be around \$5 billion per year. The loss ratio to be indemnified has to be negotiated by the international community; ultimately it should be linked to an estimated attribution of global warming to the losses covered. The requisite funding for a CIP covering the top 30 percent of losses arising from the most extreme climate events (return period of 1 in 100 years) in eligible developing countries can be assessed as: indemnification of the top 30 percent of the total direct economic losses (both public and private) would range between USD\$2.7 billion and USD\$3.6 billion, with the maximum insured losses to be capped between 10 and 50 billion depending upon the availability of premium income for the pool. The gross annual costs of the suggested insurance scheme including capital and administration costs of reinsurance would range between USD\$3.2 billion and USD\$5.1 billion for the range of the above.

Climate negotiators considering the creation of a CIP might ask: Why invest adaptation funds in a CIP when we could, instead, allocate these same funds to national adaptation programs that include an insurance module? One answer: Disbursing a portion of climate adaptation funds to the CIP pools the risks of extraordinary losses, costing far less money or requiring far less reinsurance than if each country created its own fund or made individual insurance arrangements.²

KEY QUESTIONS FOR THE INSURANCE INDUSTRY

Climate negotiators express great interest engaging the private sector and other relevant stakeholders and communities in the context of risk insurance. Several questions arise about what the industry would need to participate in any mechanism created by the UNFCCC Copenhagen agreement in December 2009.

First, what would be most necessary to engage in the design and provision of climate risk insurance, the private sector? In a statement to the climate negotiators on April 6, 2009, Professor Peter Hoeppe of Munich Re emphasized that “The insurance sector would need assurance that premiums for the various insurance programs would be “risk adequate”—meaning that the premiums are sufficient to cover expected losses.” Correct, risk adequate pricing is a key for sustainable insurance business. In many of the target developing countries the database for pricing is currently insufficient. For countries without suitable meteorological as well as historical loss data, it is imperative to build up systems that could fill data gaps in the medium term. During a transition phase before all necessary data is in place, modeling approaches and comparisons with other similar countries where data is available could help to make risks in such countries insurable. Further, while the appropriate data basis is being established, the potential for inaccurate loss estimates could be covered by an insurance pool solution such as that

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FOOTNOTE:

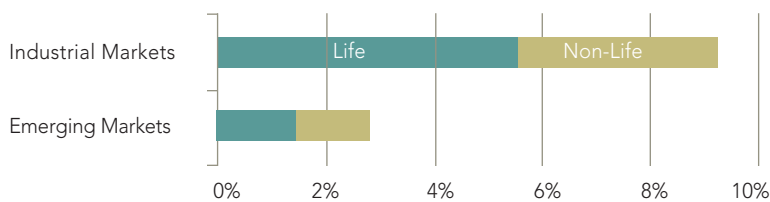
- ² The CIP will utilize market-based pricing of its cover and will transfer risk to private risk carriers. This helps avoid distorting private capital markets or catastrophe risk reinsurance markets.

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suggested by MCII. As currently the losses from weather-related disasters in developing countries are about 7 percent of global losses, cover of this kind should not pose an insurmountable obstacle for the capital requirements of insurance. Climate risk insurance programs, such as that proposed by MCII, could be established in a time range of three to five years—assuming prompt action would be taken to establish a sufficient basis of data.

Second, given the current underdevelopment of insurance markets in many developing countries, what kind of enabling conditions would need to be established to ensure the success of insurance programs to enhance the ability to adapt to climate change? Current insurance penetration in terms of premiums in percentage of GDP amounts to roughly 4 percent in industrial markets, whereas in emerging markets it amounts to less than 2 percent (see Figure 2).

**Figure 2: Insurance Penetration 2007
(Non-life premiums in % of GNP)**



Source: Swiss Re, *sigma* No 2/2009

Losses from and natural disasters are typically absorbed by individuals, corporations and insurers. In case of low insurance penetration (e.g., in emerging markets) insurers only absorb a fraction of the losses.

Thus, especially in early phases, the MCII proposal to the Climate Talks is based on a internationally supported mechanism that would facilitate public private partnerships with clearly defined roles and a few hallmarks of the climate negotiations process: The international community will, in some form, pay for the costs of many activities that are needed to help those vulnerable countries most affected by climate change. This would include the premiums and associated costs of a climate risk insurance program. The risk that long-tailed events are miscalculated can be avoided by calculating premiums on an annual basis. This allows insurance providers to adjust the risk assessment to

new scientific findings or additional loss experience annually. Insurance capacity will not be affected significantly as additional money needed to provide insurance coverage for extreme weather-related hazards (associated in part with climate change) will come out of the climate agreement expected in December 2009.

Developing countries could receive international support to promote sustainable, affordable and incentive-compatible insurance programs that serve the poor without crowding out private sector involvement. The public sectors in participating countries would be tasked to set enabling conditions and engage in measurable risk reduction activities necessary for adaptation to climate change. The private sector would have enhanced opportunities to provide risk transfer and risk management services.

ON THE ROAD TO COPENHAGEN

During the current Bonn Climate Talks, the delegations called strongly for insurance measures and began hammering out negotiating text reflecting their priorities regarding insurance. Prof. Peter Hoeppe, chair of MCII and head of Geo Risks Research of Munich Re stated: “The decision at the climate talks in Bonn has made it very likely that insurance solutions for developing countries will be part of the climate agreement that hopefully will be decided upon at the end of this year. MCII will help support this process in the next round of Climate Talks in June by delivering a technical paper, together with ISDR, that explores the evidence on how insurance mechanisms can help reduce disaster risk and support adaptation—by organizing an adaptation, risk management and insurance symposium—and by elaborating a more detailed proposal for the Bonn negotiations in June answering questions of delegations posed in the current UN climate negotiations.”

Dr. Koko Warner is a founding member and executive director of the Munich Climate Insurance Initiative (MCII). Warner also leads the Climate Adaptation Section at the United Nations University Institute for Environment and Human Security (UNU-EHS). She researches adaptation and climate risk insurance, and financial mechanisms to assist the poor. Warner is an associate at the ETH Zürich, Department for Environmental Science and Economics, and an assistant professor at the University of Richmond's Emergency Service Management graduate program. She can be reached at warner@ehs.unu.edu.

“The best starting point to address climate change is reducing risk... they look to the insurance sector for its expertise—from risk modelling and pricing to the provision of insurance services.”

ABOUT THE MUNICH CLIMATE INSURANCE INITIATIVE (MCII):

The Munich Climate Insurance Initiative (MCII) was launched in 2005 in response to the growing realization that insurance-related solutions can play a role in adaptation to climate change, as advocated in the Framework Convention and the Kyoto Protocol. This initiative brings together insurers, experts on climate change and adaptation, NGOs and policy researchers intent on finding solutions to the risks posed by climate change. MCII provides a forum and gathering point for insurance-related expertise on climate change impact issues.

MCII was founded by representatives of the European Climate Forum, Germanwatch, IIASA, Munich Re, the Munich Re Foundation, the Potsdam Institute for Climate Impact Research (PIK), the United Nations University Institute for Environment and Human Security (UNU-EHS), the World Bank and independent experts. The group is open to new members, e.g., representatives of other insurance or reinsurance companies, climate change and adaptation experts, NGOs and policy researchers seeking solutions to the risks posed by climate change.

Information about the Munich Climate Insurance Initiative (MCII): www.climate-insurance.org ♦

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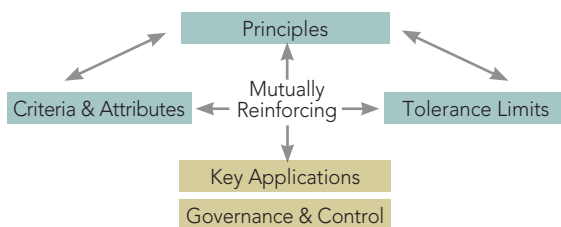
Risk Appetite Statements: What's on Your Menu?

By Michael Stramaglia

"A CLEARLY ARTICULATED RISK APPETITE STATEMENT IS A CRITICAL PREREQUISITE FOR IMPLEMENTING AN EFFECTIVE ENTERPRISE RISK MANAGEMENT PROCESS. This represents a relatively new (albeit rapidly evolving) area of practice as evidenced by the large number of organizations that have yet to develop a formal risk appetite statement, and by the lack of any clearly established best practice standard among those that have.

Figure 1 outlines a proposed framework for structuring a formal risk appetite statement.

Figure 1: Risk Appetite Statements: A Proposed Framework



It is proposed that each of the five key components of this model should form a primary section of the formal risk appetite statement. This article attempts to outline this framework and present some key suggestions and considerations regarding the form and content of these key elements in the context of a comprehensive enterprise risk management discipline.

KEY RISK APPETITE PRINCIPLES

The risk appetite statement should include a set of core principles that reflect the organization's enterprise risk management objectives and risk taking philosophy. This section therefore provides the foundational context for the remaining sections of the risk appetite statement. An organization's risk appetite defines the type and amount of risk it is willing to take on in pursuit of its vision, mission and objectives. This suggests the following examples of principles that might be covered in this section of the formal risk appetite statement:

- *Strategic Alignment*

Any organization generally needs to take on and successfully manage risk in order to achieve its strategic goals. The risk appetite statement should highlight this linkage

and identify those risks it deems to be core (intimately linked to customer value proposition, business strategy and return prospects), non-core (not aligned with core strategy and, hence, little or no risk appetite reserved) or collateral (incurred as a necessary by-product of assuming core risks and, hence, not directly pursued and ideally mitigated to the extent that the level residual risk is balanced to the cost of control).

- *Stakeholder Interests*

The risk appetite statement needs to appropriately balance the various needs, expectations, risk/reward preferences, investment horizons, etc. of a wide range of internal and external stakeholders. In particular, for publicly listed insurance companies, the risk appetite should support the pursuit of shareholder value while ensuring that the company's ability to pay claims and fulfill long-term policyholder commitments is not compromised. The risk appetite should also support the maintenance of target credit and financial strength ratings, and ongoing favorable access to capital markets.

- *Alignment with Corporate Values and Culture*

An organization's risk appetite should appropriately reflect its core values. The formal risk appetite statement provides an ideal platform for senior leadership to articulate its corporate values and attitudes to risk, and to set a clear "tone from the top" with regard to risks to reputation and brand value.

- *Risk Management Capacity and Capability*

The risk appetite should be explicitly calibrated to the financial risk taking capacity (current as well as reasonably obtainable) as well as the organization's specific risk management capabilities. It should actively seek out risk taking opportunities where these capabilities can be effectively leveraged and, conversely, avoid those areas where it does not have the requisite risk management skills or available financial capacity.

The CRO should be prepared to assume the role of Chief "Reality" Officer in order to ensure that the risk appetite statement appropriately reflects this important principle.

- *Total Portfolio Perspective*

Adopting an enterprise risk management framework requires that risks and opportunities are not just considered based on their intrinsic merits, but also based on their marginal contribution to the organization's aggregate risk position. In particular, the risk appetite should explicitly provide for the recognition and management of diversification and concentration effects across the enterprise risk portfolio.

- *Returns Commensurate with Risks*

An organization must establish a risk appetite that is commensurate with its target return expectations. The risk appetite statement should facilitate the effective iteration and ultimate reconciliation between these two fundamental elements. This is particularly true of insurance entities where, by definition, risk management is very much at the core of their customer value proposition. This generally requires that the risk appetite framework should incorporate some form of risk budgeting process whereby risk capacity and capital can be allocated, on a total portfolio basis, across opportunities that collectively optimize the organization's overall risk adjusted returns.

While a number of the above examples may have applicability to a wide range of institutions, the specific scope and definition of these and any other applicable principles must be suitably calibrated to the actual risk philosophy and circumstances of each organizational application.

RISK TOLERANCE LIMITS

Risk tolerance limits are quantitative financial benchmarks that set out the amount of risk an organization is prepared to take on in specified key risk categories. They therefore provide a key mechanism for cascading the principles outlined above into more explicit management guidance. It is clearly not possible to develop explicit risk tolerance limits for all the risk categories that an organization faces (for example, many operational risks do not readily lend themselves to being expressed in the form of standard risk tolerance limits). However, the risk appetite statement should set out clear risk tolerance limits for at least the organization's core financial risks (i.e., credit, market, insurance).

Management will need to consider a number of key questions in designing this portion of the risk appetite statement, including:

- *What risk metric(s) will be used to define the risk tolerance limits?*

A common "currency" is required for quantifying risk tolerance limits across the spectrum of specified key risks and for measuring the actual exposure levels against these prescribed limits. Potential risk metrics can span a number of key dimensions, as illustrated by the following:

**Figure 2: Risk Tolerance Metrics:
Two Dimensions (examples)**

	Flow-based Value Measure*	Point in time Value Measure*
Accounting	GAAP Earnings-at-Risk	Regulatory Capital-at-Risk
Economic	Change in Market Consistent Embedded Value-at-Risk	Economic Capital-at-Risk

* Expressed relative to some form of base-line level (e.g. plan, expected, current state, etc.)

Each quadrant merits consideration for inclusion in any insurance company's risk appetite framework, and there are various pros and cons to each. For example, an organization may decide to establish risk tolerance limits for both earnings-at-risk (ease of communication, clear alignment with key stakeholders, etc.) and some form of economic capital-at-risk (most closely reflects long-term intrinsic value, is risk-based, etc.) in order to appropriately span these key dimensions and balance short- and long-term business perspectives.

Related questions include whether the risk appetite statement will reflect tolerance limits based on prescribed deterministic stress tests (and how the associated stress scenario(s) for each risk category should be defined) or summary statistics derived from some distribution of risk outcomes (including choice of percentile or conditional tail expectation (CTE) level(s)).



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- *Should risk tolerance limits be structured as “maximums” or “targets”?*

Risk tolerance limits have traditionally been positioned as maximum risk level control points. Emerging best practice frameworks incorporate a structure based on risk tolerance target levels or ranges, bounded by both maximum and minimum control points. This approach obviously supports a more strategic enterprise risk management approach by incorporating more explicit management perspectives and biases on opportunities for introducing both short and long positions relative to the articulated target risk appetite.



- *At what organizational level(s) will risk tolerance limits be defined?*

In addition to setting out risk tolerance limits at the aggregate level, the risk appetite statement may set out limits at more granular organizational levels. The “top down” process for allocating enterprise risk taking capacity across the more discrete organizational units, including the treatment of diversification effects, should also receive appropriate coverage in the formal risk appetite statement.

- *Will the risk tolerance limits be based on “gross” or “net” risk exposures?*

Principles for reflecting the impact of potential management actions, diversification/concentration impacts and other key mitigation strategies should be explicitly codified in the risk appetite statement, and supporting methodologies should be developed for appropriately incorporating these considerations into the prescribed risk tolerance limit methodology. Rather than approaching these considerations on an “either/or” basis, important risk mitigation insights and transparency can be achieved by evaluating risk exposures on both gross and net bases.

RISK APPETITE CRITERIA AND ATTRIBUTES

While risk tolerance limits provide valuable technology for translating risk appetite principles to management practice, more supporting guidance is generally required in order to develop sufficiently robust and comprehensive risk appetite statements. These could take the form of qualitative and/or quantitative criteria. Examples of quantitative criteria include key financial ratios (such as debt service coverage, financial strength ratings, liquidity ratios, risk adjusted return metrics, etc.) or various key notional limits that have been calibrated to, and therefore enable the effective implementation of, the explicit risk tolerance limits outlined above (interest rate duration mismatch limits, underwriting retention limits etc.).

The risk appetite statement should also set out key qualitative criteria when required to provide further context and definition to the risk appetite principles. For certain key principles (such as corporate values alignment in the examples outlined above), these may represent the only qualifying guidance; however, even risk principles that have been translated to financial and quantitative criteria can often benefit by some form of supporting qualitative definition. These qualitative criteria will, by definition, tend to be somewhat subjective. Consequently, the risk appetite statement should attempt to provide sufficient definition and detail so as to enable reasonably verifiable, replicable and more objective assessments of risk appetite assessment and alignment. This can often be achieved by developing inventories of sample transaction attributes that might give evidence to low or high levels of alignment with the applicable risk appetite principle and incorporating these inventories into some form of “scoring model.”

The articulation of the aforementioned risk appetite principles, risk tolerance limits and these supporting criteria helps to ensure that a suitably holistic management approach can be taken in implementing the risk appetite. Indeed, when appropriately aligned and integrated, the combined impact of explicitly articulating these three elements as part of the risk appetite statement should be significantly greater than the sum of the parts.

“A well crafted risk appetite statement can be an invaluable tool for helping organizations navigate through the myriad of issues and opportunities characterized by today’s challenging business environment.”

KEY APPLICATIONS

The risk appetite statement should set out the terms of reference for how this document and its embedded guidance should be positioned within the organization’s overall risk management framework and associated management decision-making processes. Given the foundational role that risk appetite plays in this regard, the statement should highlight explicit linkages to the organization’s key risk identification, assessment, response development, monitoring and reporting processes. Similarly, recognizing the important linkages that need to exist between an organization’s risk appetite and its strategic management and planning processes, the statement should explicitly identify, codify and facilitate these key areas of interdependency. Other key management processes that might warrant recognition for explicit alignment as part of the risk appetite statement include product development and pricing, capital budgeting, and mergers and acquisitions processes.

The risk appetite statement should also be fully integrated into the organization’s performance management and compensation systems. The obvious goal is to ensure that management is appropriately compensated for successfully achieving risk adjusted returns in business areas that are well aligned with the organization’s articulated risk appetite, and not inadvertently incented to pursue risk taking in those areas that are not.

It is generally sufficient that the risk appetite statement identify the key management applications where these explicit linkages are required and then set out some high level principles for how these should generally operate in practice. More detailed application guidance can be relegated to supporting policies, operating guidelines, procedure manuals, etc., as appropriate based on the organization’s particular risk governance framework.

GOVERNANCE AND CONTROL

This section of the risk appetite statement should set out the requisite protocols to ensure that it functions within an overall control environment commensurate with its importance as a foundational risk management tool. It would therefore set out applicable approval protocols (ideally at the board level) for the statement’s embedded limits and operating requirements. The statement should be subject to explicit change management controls and include minimum requirements for frequency of reviews and refreshes.

This section should also set out the specific accountabilities for ongoing monitoring and reporting of organizational compliance relative to the identified requirements, as well as the requisite escalation procedures should operational breaches arise in connection with any of the embedded limits and requirements.

CONCLUSION

A well crafted risk appetite statement can be an invaluable tool for helping organizations navigate through the myriad of issues and opportunities characterized by today’s challenging business environment. It is hoped that the continued evolution of this practice area will lead to a clearer consensus, and, ultimately, more operational convergence, of the salient themes that warrant explicit coverage for crafting formal risk appetite statements intended to satisfy “best practice” application standards. With this in mind, industry practitioners should continue an active dialog on this practice area and, as part of this process, consider the key elements outlined above as potential candidates for inclusion in their organizations’ own risk appetite statements.

The process of articulating formal risk appetite statements provides an ideal forum for active discussion and debate of the organization’s most fundamental risk management beliefs and practices. In order to derive maximum value from this activity, this process should incorporate the broad-based participation and perspectives of all the organization’s key stakeholders. It should also reflect the understanding that this is a practice area where value is generated as much through the journey as the ultimate destination, and where success often depends upon the organization’s willingness and ability to challenge conventional beliefs and explore less traveled terrain. ♦