

ENTERPRISE

R I S K M A N A G E M E N T



Who is
doing it?

IN THE FALL OF 2008, the Canadian Institute of Actuaries published a booklet entitled *Enterprise Risk Management—Should you be doing it?*, aimed at giving boards of directors and senior management basic information about the emerging field of enterprise risk management (ERM) (www.actuaries.ca/members/publications/2008/ERM/208070e.pdf). The Institute has decided to expand the effort with this second booklet, which focuses on the challenges and opportunities ERM professionals face, and how they can create value for their employers or clients.

ERM has been described as “...the process by which organizations in all industries assess, control, exploit, finance, and monitor risks from all sources for the purpose of increasing the organization’s short and long term value to its stakeholders.”⁽¹⁾ Actuaries have been at the forefront of developing ERM in the insurance industry and now the Canadian insurance industry houses some of the world’s most solid companies. We expect many pioneer actuaries will continue applying their much sought-after skills and models outside traditional fields of practice

1 www.casact.org/research/erm/frame.pdf



and bring their ERM knowledge to bear in industries that have unique ways of approaching measurement and management of risks.

To that end, the Chartered Enterprise Risk Analyst (CERA) designation was created in 2007 by the Society of Actuaries and adopted by 14 international actuarial organizations as the globally-recognized ERM credential. It sends a strong message to employers and candidates that the skill set of actuaries provides significant insight and risk management expertise, especially in this time of increased globalization. Visit www.ceraanalyst.org for more information on the CERA designation and www.actuaries.ca for more information on the actuarial profession in Canada. 

1. Life and Health (L&H) Insurance Companies

MOST CANADIAN L&H INSURERS have been practicing risk management for many years. Over time, the role of ERM has evolved to become more centralized and more formalized. Recognizable ERM practices and the formal Chief Risk Officer (CRO) role have existed for five to 10 years in most cases. This represents a more holistic view of risks across the organization, consolidation of risk management activities and a heightened profile of risk management as a critical business and management function.

The key activities associated with the transition to an ERM framework include:

- Establishment of a risk culture, providing education about risk and promoting risk awareness throughout the organization;
- Consolidated risk reporting to key stakeholders including senior management, the board, rating agencies and regulators;
- Definition and management of economic capital;

- Aggregation of risks across business units and determination of diversification or concentration effects; and
- Articulation of risk appetite, determination of the appropriate charge to be assessed for carrying various risks, and monitoring of exposures relative to appetite and capacity limits.

Most insurers measure and monitor risks according to the following categorization:

- Market risk (e.g., equity, interest rates, spreads);
- Credit risk;
- Insurance risk (e.g., mortality, morbidity, lapse); and
- Operational risk.

Asset/liability mismatch risk may be treated as a separate category, or may be considered an aspect of market risk. Strategic and reputational risks may be treated as operational risks or handled separately, according to the preference of each company—but are virtually always included in the catalogue of risks.

Virtually all L&H insurers are not only practicing ERM but are very committed to it. Companies feel ERM has already had a positive effect in allowing management to make better and

more conscious decisions and allowing the achievement of better risk balancing, improved risk mitigation and enhanced risk-adjusted rates of return. 

2. Property & Casualty (P&C) Insurance Companies

MANY INSURERS have been developing frameworks through which they articulate their risk appetite. Establishing appetite for each category of risk provides the business with the guidance it needs regarding decisions to accept and limit risks. It also allows the organization to view its risk-taking capabilities across risks and in the aggregate. While P&C insurers generally use the same high-level risk classification as L&H insurers, it is important to adapt the classification to the specifics of each business.

This first step, which cannot be omitted, is to properly categorize risks. What follows demonstrates that this important step can lead to better strategies.

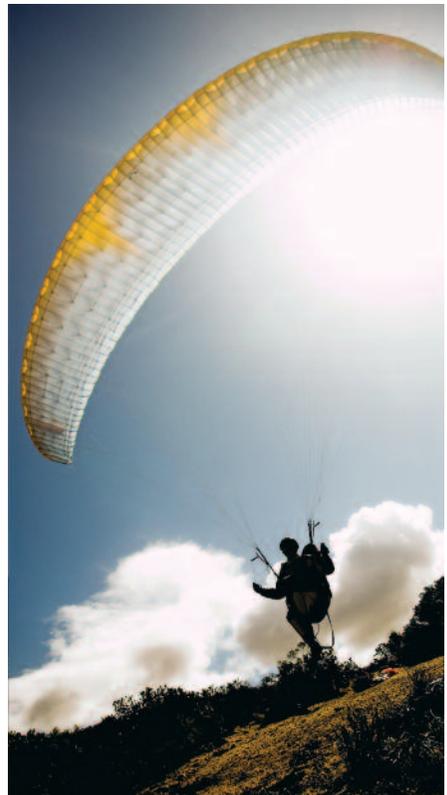
Historically, P&C companies have included their surety business as part of the underwriting or insurance risk category. Surety insurers reinforce their policyholders' commitments by promising to step in should the policyholder be unable to deliver. For example, the insurer will arrange to complete a project if a contractor goes bankrupt. While it is indeed one of the products P&C companies manufacture and distribute, its loss characteristics do not align well with other insurance risks they assume.

Surety is based on credit risk—the insurer only suffers a loss if the policyholder cannot indemnify the insurer for loss when they have defaulted on their contractual obligations. Credit risk arises for a P&C company through a number of different counterparty relationships—bond issuers, structured settlement providers, reinsurance counterparties and brokers through their broker financing activities. For each of these credit risks, one firm utilized a matrix approach to developing a risk appetite “score”. Once it aligned the scores for these counterparties as well as its surety credit risks, it discovered it was taking far less credit risk in its surety business than in the other categories for credit. It determined the risks it was accepting

for those categories were appropriate and came to the conclusion that it should be taking more surety risk. In fact, surety is a highly collateralized, low frequency, low- to medium-severity risk with a significant business opportunity.

As a result of this analysis, the firm increased its stated appetite for surety risk, targeted growth in the business and achieved it.

Although ERM is a major factor in determining risks that are outside of appetite and managing downside risk, being outside of appetite can sometimes mean you are not optimizing your risk appetite for reward. This is definitely a case for identifying upside risk opportunities. 



3. Banks and Credit Unions

BY ITS VERY NATURE, the banking sector has been managing risks for many years. Until the Basel II Accord—a catalyst for a review of procedures and for the application of risk management in a comprehensive way—banks managed risk in silos. More recently, the last financial crisis has forced regulatory and rating agencies to emphasise the importance of integrated risk management.

Historically, banks have managed credit and market risk as well as interest rate risk (asset-liability matching) and liquidity risk. During the 1990s they witnessed a rapid development of risk evaluation tools: credit scoring models enabled them to select new exposures with a better understanding of the probability of default, and behaviour credit scoring introduced a way to manage credit exposures throughout their lifecycle.

Basel II adopted the principle of ERM where market, credit, and operational risks had to be quantified and managed in a comprehensive way. Banks and credit unions adopted an organisation structure promoted by the new standards. For example, Desjardins Group, a network of caisses populaires and subsidiaries, restructured in 2004 to establish an overall oversight procedure for all risks, with a risk management committee using tools such as dashboards to make informed decisions.

For most institutions, the three main risks

(credit, market, operational) identified in the Basel principles have always been quantified independently. However, organisations now look at them in parallel and endeavour to master their interactions. For some time, institutions have been busy developing methodology to stress test their balance sheet, a principle of the Basel II Accord. Through its risk management division, Desjardins Group conducts such tests and develops measures for each risk. It has also implemented the measures at each of its institutions.

The financial crisis has done much to reduce scepticism that prevailed in the banking sector regarding certain modelling scenarios because they were thought to be overly pessimistic and were therefore given no credibility. Now implementing an ERM framework requires a strong effort to promote awareness and develop a common language. It enables an organization to establish its level of risk tolerance, which must be related to a business plan and incentive pay in order to be effective.

ERM in banking evolved rapidly during the last decade, but there is still a lot of work to accomplish. Actuaries, with their rigor and strong mathematical and financial background, can make vital contributions to its success. 

4. Pension Plans and the Link to ERM

CANADIAN PRIVATE SECTOR ORGANIZATIONS which sponsor defined benefit (DB) pension plans account for \$500 billion of assets under management and cover about 4.6 million employees in their respective pension plans, the goal of which is to provide employees with income during their retirement.⁽²⁾ A pension plan is an important financial entity in any organization.

Under DB pension plans, the benefits are based on a defined formula; the plan sponsor invests pension contributions in a fund, the investment of assets are managed by the sponsor or board of trustees and they take the responsibility for benefits' delivery to beneficiaries. Therefore, under

a DB pension plan, the plan sponsor is subject to market, interest, mortality, operational, regulatory and other risks.

Due to the nature of pension plans, the traditional practice has been to manage them as standalone financial entities; however, some large multi-employer plans use ERM concepts to prudently manage these plans. Increasingly, the emerging practice for single employer pension plans is to coordinate and manage specific risks.

Pension plan risks impact:

- Shareholders, since the risks have a direct impact of the organization's financial statement, and

² Human Resources and Skills Development Canada website

- Plan beneficiaries as the security of their retirement income is dependent on careful management of the plan’s assets and ultimately on the employer’s financial situation. DB pension plan risks focus on several key measures. These include volatility and downside risk of pension expense shown on the income statement, cash contributions and funded status—the difference of assets and liabilities shown on the balance sheet. Depending on the size of the pension plan in relation to the enterprise value, the level of funding contributions in relation to the free cash flow, the impact of pension expense on earnings on the income statement, and the maturity of the pension plan (whether it has more inflow as opposed to outflow

of funds), the plan’s risks will have a significant impact on stakeholders.

At the pension plan level, as a standalone financial entity, robust processes and tools are generally applied. Strategies, governance and accountability structures are implemented, risk measurement and methodologies are utilized, and there is adequate monitoring and reporting. Therefore, if an enterprise has implemented, or is implementing ERM, the pension plan can be structured within an ERM framework and plan risks can be effectively coordinated and managed at the enterprise level.

Pension risk within the ERM framework is an emerging practice and actuaries are leading the way in managing these risks. 

5. Micro Insurance Organizations

THE TERM MICRO INSURANCE refers to a social and commercial movement that started in the 1970s to provide insurance to the vast majority of the world’s population with no access to traditional insurance companies.

L&H insurance products (no pension plans) are offered but so are accident and disability products to a limited extent.

Micro insurance consultant Firozali Hirji, FCIA, FSA, FIA, says, “Before micro insurance, a typical entrepreneur in a poor country could face a bad health event that would require him to sell all his possessions to pay for it. He would slowly climb out of poverty only to be hit with the next bad health event.”

The business model of a micro insurance organization (MIO) is one that takes into account the culture, social norms, people’s needs and circumstances, surroundings and ability to pay. Models fall broadly in four categories:

- Provider:** The traditional insurance model where the insurer assumes the risks and markets its products;
- Partner-agent:** The insurer is involved but not with the marketing;
- Partner model:** Where a hospital, for example, is both a health care provider and a seller of insurance products; and
- Community:** Where members of the community or a union would get together and insure each other.

In addition to risk traditionally faced by insurance companies, these MIO’s face three important risks:

- Environmental catastrophes:** The communities targeted by micro insurance (and the organization offering it) are impacted more by floods, droughts, earthquakes, tsunamis, etc., than first world policyholders.
- Lapsation:** If a product is not priced properly at inception, high claims in following years will drive rates up and the sign-up rate down, bringing the system to near collapse. Actuaries beware: being very precise in premium calculations will not help you because of a lack of data. The way the micro system is managed will have a greater impact on claim rates.
- Credit risk and moral hazard:** Micro insurance and micro loan holders are very poor but their numbers make the experience very credible. Access to credit and to insurance has a huge impact on their lives. Therefore they will not risk jeopardizing the ability to secure their next loan.

Opportunities in ERM for these organizations include better reinsurance treaties for catastrophic risks (especially those of environmental nature), better regulatory frameworks, and education of stakeholders (non-governmental organisations, governments, World Bank, donors, etc.) to improve risk management frameworks and practices. 

6. Social Housing

BUILDINGS OF ALL TYPES are inherently exposed to numerous risks. This is particularly the case for those designed as multiple residences. Buildings constructed for social housing are prime examples of this. In Canada, the number of persons housed in various forms of multiple tenant social housing is in the hundreds of thousands. Ontario, for example, excluding homes provided on First Nation reserves, accommodates almost 235,000 persons in social housing valued at \$40 billion and managed by 1,421 providers, i.e., government agencies, non-profit corporations and community groups.

Most agencies and corporations managing the social housing sector are well attuned to ERM, at least in most modern industrial nations. The handling of the various forms of risk has primarily consisted of a periodic physical assessment of major risks and implementation of various measures to minimize their potential effects. Beyond this, for example, there has not been any concerted effort to measure economic capital—the capital a company would need in case of a big shock.

The risks involved in social housing are all of those listed in the Institute's booklet, *Enterprise Risk Management—Should you be doing it?*, but

particularly financial, legal and regulatory, and hazard risks.

Firstly, the actuary is employed to develop, with the use of contingencies and the time value of money, financial plans to value the replacement costs and the optimum funding programs for all important equipment (elevators, HVAC) and structures (roofing, windows, brick/concrete) of each social housing building. Secondly, the actuary incorporates into such plans measures of unexpected losses attributable to failure of one or more of these elements.

This second stage in the actuary's work determines the margins or surplus that cover potential losses within a given level of probability, i.e., economic capital, and such determinations can build in sensitivity tests based on equipment and structure maintenance options to reduce the funds required for margins.

ERM in the management of multiple residences housing is a perfect fit with the actuary's expertise. It begins with the social housing sector, where the managers are actively looking for professional assistance to develop creditable financial plans to justify government funding. It can then lead to retirement residences, medical institutions, condominiums and more. 

7. Workforce Risk Management and the Link to ERM

HAVE YOU EVER been in your car, stopped on a major road at rush hour, wondering why the road was designed to handle traffic volumes that were surpassed 20 or even 30 years ago? The answer is simple—government then didn't have the tools, data and analytical rigour to look this far into the future. Luckily for the citizens of British Columbia, their government is using ERM principles to ensure services and staffing will be at appropriate levels in the future—a particularly arduous task when the looming demographic issues are coupled with an economic downturn.

Actuary Deanna Napen is executive director of Workforce Risk Strategies, affiliated with the Future of Work Initiative of the Ministry of Citizens' Services for the Province of British

Columbia. BC's efforts started in 2006 and have broadened to encompass business and economic scenario analysis. Napen says, "Our analysis and tools are being adopted at the most senior strategic level and will be critical as we move forward. How do we know we will have enough employees within the public sector realm to deliver the services that will be demanded by BC's citizens in the future? And, at the same time, ensure our employees have the appropriate skill sets needed in the short and long term to ensure the best service delivery to our citizens?"

Her focus involves looking at current staff, projecting that data into the future, performing historical experience analysis and anticipating how these past trends may change, estimating

coming demands for staff and the profile of the future workforce in an extremely diverse “business”, plus modeling the anticipated impact of potential scenarios and the delivery of business strategies for individual ministries or other critical workforce segments.

Napen describes her role as a holistic approach to planning—across government. “Our efforts have resulted in much more focus on corporate initiatives that consider the vision for tomorrow, rather than a ministry-by-ministry approach that

doesn’t consider the broader corporate picture. In addition, there is ongoing analysis relative to the identification of key streams necessary for the delivery of business tomorrow.”

Clearly, her work is focused on preparing for the future—both in the public service and broader public sector realms. Because ERM demands the effective management of potential opportunities and adverse effects, workforce planning has quickly become a very important tool in BC’s approach and ultimately its future. 

8. Mining Companies

THERE ARE PARTICULARITIES of mining that make the application of financial industry-style ERM very challenging.

Traditionally the management of risk in the mining sector has been focused at a functional level rather than on processes. It is easier, for example, in the financial industry to bring together all the people who touch a process associated with a product line than in mining, where the different functions focus on the risks in their areas. Health and safety (H&S), reputational, strategic and financial are key risk categories. H&S risk is downside in nature and companies generally attach a zero tolerance to it; every worker home safe and healthy every day. Reputational risk is a broad category that engulfs the downside impact of strategic decisions—in the YouTube age, news about incidents travels fast and the entire industry tends to be painted with the same bad brush because of the actions of a few bad players.

As the sector expanded its geographical reach, political risk has increased—in most jurisdictions, natural resources are considered national assets and require the negotiation of royalty and other agreements.

Heat risk maps, with severity and likelihood of impact as the key variables, are the measurement tools of choice in the industry. Financial impact is both from a revenue and cost perspective while qualitative impacts such as H&S and reputation are also assessed. There is a chronic lack of reliable data.

The industry is sophisticated in its ability to manage market risk through hedging the end

product and/or its consumables. Controls are prioritized and put in place based on the level of inherent/gross risk. With proper controls, the residual risks can be low but consideration has to be given to the fact that they are often reliant on the human factors. For this reason the mining sector is working on robust control assurance processes to help manage the risk of a control failing to operate as designed.

ERM is in its early stages in the North American mining sector and it has been used as a catalyst for more cross-functional dialogue. The concepts are most evident in the capital projects groups of many companies where an ERM mindset is employed in the design and development of new mines.

Next steps in the evolution of ERM include linking performance to risk, having a CRO reporting directly to the CEO or the board and finally putting a proper cost to risk by using more simulation, modeling and aggregation of risks techniques—techniques actuaries know a lot about. 



9. Public Utility Companies

HYDRO ONE INC. is an Ontario corporation owned 100% by the Province of Ontario. It owns and operates approximately 96% of Ontario's electricity transmission capacity. It also has 1.3 million distribution customers spanning 75% of the province, predominantly in rural areas. It has annual revenue of over \$4.5 billion and total assets of about \$15 billion. It has around 5,400 regular employees and about 7,000 pensioners.

The types of risks it faces are: asset (e.g., from the weather or product failure), funding and financial, regulatory (as all revenue has to be communicated to stakeholders and approved by the Ontario Energy Board), safety and environmental, technology (as computer systems are upgraded), and pension, among many others.

As is typical of most large organizations, Hydro One was managed from a risk perspective on a traditional basis in silos until 2000. As part of creating a modern business organization, senior management decided to implement ERM. Each year, management reviews and updates its corporate risk tolerances, which are discussed and approved by executive management

and reviewed by the appropriate board committee.

Once the tolerances are agreed upon, they are then used in business planning to prioritize how resources are allocated. The company has long-term assets that can last anywhere from 40 to 80 years, and there are extensive mathematical analyses of these assets and their performance which require actuarial-type formulae.

However, resources and funding to maintain these assets are also in competition with other operational requirements such as training staff, computer system enhancements, cutting trees, etc. Its ERM methodology requires each specific type of expenditure to be risk rated (i.e., scored on a table of values based on impact and probability). All requested expenditures are entered into a database and sorted in descending sequence. The annual plan is then determined based on this prioritization.

Over the years, Hydro One's board and board committee members have acknowledged its leadership in this area compared with other companies on which they serve. It echoes the saying, "ERM can be considered just good management." 

Conclusion

As previously mentioned, each industry has its unique way of approaching classification, measurement and management of risks and the maturity level of their ERM framework will vary. The absence of credible historical data in some industries partly explains these differences.

One would probably argue in favour of having a framework, albeit an imperfect one, rather than no framework at all. At least the dialogue on risk gets started and the framework improves over time as the culture becomes more risk minded. 

This booklet was created by the ERM Applications Committee of the Canadian Institute of Actuaries.

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Actuaries employ their specialized knowledge of the mathematics of finance, statistics and risk theory on problems faced by pension plans, government regulators, insurance companies (both life and property/casualty), social programs and individuals.

Opinions expressed are those of the interviewees.

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