Risk Management and the Actuary’s role in Insurance
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What is Risk & Risk Management

Risk is the ‘effect of uncertainty on objectives’
An effect may be positive, negative, or a deviation from the expected. Also, risk is often described by an event, a change in circumstances or a consequence (ISO 31000)

Risk Management can be defined as the set of ‘coordinated activities to direct and control an organisation with regard to risk’.
(ISO 31000)
Risk Management Process (from ISO 31000)

Establish context

Risk assessment

Risk identification

Risk analysis

Risk evaluation

Risk treatment

Communication and consultation

Monitoring and review

Source: A Structured Approach to Enterprise Risk Management (ERM) and the requirements of ISO 31000
IRM, AIRMIC, Alarm 2009
Benefits of Risk Management

- Being in a position to identify the risks early, improving efficiency
- Allocating risk to those best placed to manage it
- Preventing the over allowance of contingency
- The business can plan ahead properly
- Having more predictable and certain outcomes
Getting Started

Outline Strategic Objectives
- Understand the strategic objectives of the organization

Review Overall operations
- Understand the organization's operations and existing control environment

Learn our risks
- Understand the organization's inherent risks

Determine the likelihood of a risk occurring and the potential impact that its materialization can have on the organization

Prioritize our risks
- Set our risk management priorities based on the priority assigned to the various risks

Consider various Risk Control (Risk Management) alternatives
Getting Started

Outline Strategic Objectives

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Consider various Risk Control (Risk Management) alternatives
Define the risk universe

Agree on a common risk language and provide a risk education process

Assess the current state of risk awareness

Assess risks, Identify and evaluate any existing controls

Decide appropriate risk responses (accept, avoid, share, mitigate) to each of the risks in our risk portfolio

Define risk appetite and set levels of risk tolerance
Risk Categories should be based upon the requirements of the company. The following risk categories could be reflective of a Insurance Company’s Risk Taxonomy.

<table>
<thead>
<tr>
<th>Business Risks</th>
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<tbody>
<tr>
<td>• Underwriting</td>
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<tr>
<td>• Claims</td>
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<td>• Pricing</td>
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<td>• Emerging Risks</td>
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<td>• Credit Risk</td>
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<tr>
<th>Customer Risks</th>
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<tr>
<td>• Distribution channels</td>
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<td>• Alliances</td>
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<td>• Advertising and marketing</td>
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<th>Strategy Risks</th>
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<tr>
<td>• Risk of not following company’s stated strategy</td>
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<table>
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<th>Reputation Risks</th>
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<tr>
<td>• Potential brand damage</td>
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Risk Universe

IT / Infrastructure risks
- IT Systems
- Management information
- Disaster Recovery planning
- Business Continuity Planning

Compliance Risks (related areas)
- Legal
- Regulatory
- Corporate governance

People Risks
- All people management related risks
- Staff retention
- Succession planning issues

Financial Risks
- Equity
- Interest Rate Risk
- Spread Risk
- Liquidity
Actuarial role

\[ S_{jk}(q) = \begin{cases} 1 + 8\phi_i \int_0^{r_{\text{max}}} (P_{jk}(r) - 1) \frac{\sin(qr)}{q} \, dr & \text{(2D)} \\ 1 + 24\phi_i \int_0^{r_{\text{max}}} (P_{jk}(r) - 1) \frac{\sin(qr)}{q} \, rdr & \text{(3D)} \end{cases} \]

where

\[ \phi_0 = \begin{cases} \frac{\pi N}{4 L_s^2} & \text{(2D)} \\ \frac{\pi N}{6 L_s^3} & \text{(3D)} \end{cases} \]

and

\[ n(r) = \phi_0 O(r) = \begin{cases} \frac{4N\phi_0}{\pi} 2\pi r = 8N\phi_0 r & \text{(2D)} \\ \frac{6N\phi_0}{\pi} 4\pi r^2 = 24N\phi_0 r^2 & \text{(3D)} \end{cases} \]

and

\[ P(r) = \frac{g(r)}{n(r)} \text{ with } 0 \leq r \leq L_s/2 \]
What is an Actuary?

A professional who attempts to quantify the impact of uncertain or risk contingent events. Actuaries estimate the financial consequences of risk using a combination of several skills, including:

• Mathematics
• Probability and Statistics
• Financial Theory
• Financial Economics
• Risk Theory
• Extreme Value Theory
• Information technology
• Basic programming skills
• Economics
• Business specific skills
Where would you find an Actuary

- Life Insurance
- Risk Management
- Non – Life Insurance
- Banks
- Pensions
- Health Care
- Social Security
- Anywhere where risk needs to be quantified
Insurance companies are in the business of making profits through the acquisition and management of risks.

Actuaries usually lead the implementation of risk management frameworks for the identification, measurement and monitoring of risks.

Actuaries assess and manage the key risks that insurance companies are faced with such as market, credit, liquidity, operational and insurance risks.

Actuaries estimate and analyze the level of capital required for Companies to meet their risk strategy and identify the products that add value to the Company relative to the risk assumed.
Regulators internationally recognize the value added by Actuaries in both Life and Non-life insurance Companies.

Main concern of regulators is the protection of policyholders rather than the performance of Companies.

Main Concern of the Actuary is to strike a balance between the protection of policyholders and the performance of the company.

Non-Life Companies without an actuary on board sometimes cannot appreciate or understand the value that Actuaries can add to their business.
Actuaries in Non – Life Companies

In Non-Life Insurance, Actuaries are involved and can add significant value in several areas such as:

- Reserving
- Pricing
- Risk management
- Reinsurance modeling
- Financial Projections
- Reporting
- Modelling of any sort of uncertain or contingent financial event

Predicting the future whilst (partly) looking at the past
Reserving is an important consideration in both Life and General Insurance.

Reserving is the process performed by an actuary to mathematically determine the amount of money the company must have on hand to pay future claims.

The Actuary has to analyze the development of historic claims, assess the financial and business environment and estimate the future.
## Gross Paid Amounts Triangle for Engineering

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### Accident Vs Underwriting Year

The Actuary Investigates the Triangles Formed for any Patterns or Trends

After a number of Development Years Claims reach their ultimate amount

Historic Development of Claims can be the basis for estimating future development

Different Reserving Methods exist (from very simple to rather complicated ones)
Analyze historical data to assess the ultimate cost of claims stemming from Outstanding Claims as well as the in-force policies. Methodologies employed recognize the likelihood of claims developing at both higher and lower levels than estimated by the claim handlers. Methodologies employed recognize the likelihood of receiving claims which have not yet been reported (IBNR claims).
Benefits of establishing adequate reserves:

Compliance with regulations, compliance with financial standards and avoidance of unexpected losses in the future when claims are finally settled.

Estimation of accurate (“Best Estimate”) reserves provides to the management the true picture of the Company’s performance (BE reserves are used to assess the realistic cost of historic claims).

Future actions are taken based on the true picture of the Company’s performance (increase/decrease premiums, attract/retain specific segments, stay in business or not, etc).
Actuaries analyze historical data to assess the theoretical premium to be charged. Analysis followed by discussions with various departments to ensure that final premium offered to customers is competitive. The Pricing process helps identify profitable and non-profitable segments of the Company.
Non – Life Reporting

Actuaries can be instrumental in implementing Management Information Frameworks to enable the Company’s management to make risk based decisions.

- Design and implement a monitoring system
- Develop early warning system
- Make risk based decisions
Actuarial science and its principles are at the heart of any reinsurance company. In direct companies actuaries can model the behavior of their reinsurance programs and assess their effectiveness. Actuarial principles and models can also be used to help optimize the reinsurance structure of a direct company.
Actuaries can build and run financial projections model for a particular project or the entire insurance enterprise.

Specific behaviour of assets and liabilities can be actuarially modelled for increased accuracy.

Multiple scenarios, stochastic scenarios and stress testing can enhance the quality of the output of the model.
An actuary uses a number of “tools” in performing the actuarial function:

- Actuarial skills
- Specialized software
- Internally developed models
- Data
Data is information that can be used to identify a pattern, a trend, a behaviour that can form the basis for an actuarial model and/or one or more of the parameters and assumptions of the model.

Data is everything to an actuary.

Data must be relative, of good quality and of sufficient volume and history according to the purpose for which it is needed.

Actuaries spend a lot of time and effort analyzing data and must cooperate with a number of people in order to get the desirable result.
Risk Management or Actuarial Science?

- Efficiently allocate capital
- Improve capital budgeting decisions
- Manage effectively catastrophic risks
- Better manage new activities (expansion plans, new territories, mergers and acquisitions, etc)
Implementing a Risk Management Framework
We must have the basics in place first

- Engaged Board of Directors
- Clear Risk Management support from the top i.e. CEO driving a top down approach throughout the organization
- Fully formed and functioning Risk Committee
- Clearly written Risk Management policy and Governance procedures
- Development with BOD of Corporate Risk Appetite Statements
Lessons Learned from Others

Risk Management is not a “one time” project but a continuous process that needs to be:

- Embedded into both strategic and daily decision-making
- Subject to effective corporate governance
- Supported by an appropriate control environment

It can become complex - so keep it simple

Head of Risk or Chief Risk Officer has a very critical role to play as he / she must support all managers in understanding how to implement RM in their responsible areas

Experience has shown that operating managers must be responsible and held accountable for effective risk management

Risk Management works well when it is built into the fabric of the organization and executed by those with the requisite authority and responsibility for running the business
Define your Risk Appetite

Risk Appetite
- the amount of risk an organisation is willing to seek or accept in pursuit of its long-term objectives

Risk Tolerance
- the boundaries of risk taking outside of which the organisation is not prepared to venture in pursuit of its long-term objectives

Risk Universe
- the full range of risks which could impact, either positively or negatively, on the ability of the organisation to achieve its long-term objectives

Risk Appetite helps formulate Strategy and guide actions
The role of Management on risk

- Responsible for implementing board policies on risk and control
- Identify and evaluate risks faced by the business for consideration by the board
- Design, operate and monitor a suitable system of internal controls to manage risks within the risk appetite set by the board
Developing a Risk Culture
Developing a Risk Culture

- Culture is developed and not enforced
- Do not impose on staff a certain “Risk culture”
- Culture development takes time and must be gradual
- Everyone has a role to play in the process
- Risk management and compliance are everyone’s responsibility
- Try to embed a culture that views good risk management and compliance as being good business practice
Steps in Developing a Risk Culture

- Get staff to involve gradually into the process with increasing level of involvement over time
- Educate the Management and the Board
- Workshops to better understand Risk Management and their role in the process
- Involve the staff in the risk definition process and the completion of the Risk Definition Templates
Steps in Developing a Risk Culture

1. Hold risk management discussions in all departmental and management meetings.
2. Introducing risk management capabilities as an additional staff performance appraisal criterion.
3. Build a dynamic Risk Register that can be viewed by staff as their own development.
4. Regularly communicating the risk management program to management and staff so that it is visible.
5. Foster an environment in which staff and management are encouraged to identify and manage risk.
Risk Management Challenges
Embedding the risk management culture

Obtaining **buy-in** from the board, senior management, business unit management and all staff

Ensuring **widespread understanding** and the involvement of all business units

Ensuring **consistent risk profiling** and risk management reporting

Adhering to **continuously changing** regulatory environments

Acknowledging that we are managing risks in a **dynamic and uncertain world**
Enterprise Risk Management - ERM
What is Enterprise Risk Management

**CAS Definition of ERM**

- The process by which an organization:
  - Assesses
  - Controls
  - Exploits
  - Finances
  - Monitors

**risks** from all sources for the purpose of increasing the organization’s short and long term value to its stakeholders.

**Enterprise Risk Management (ERM) seeks to:**

- include all categories of risk and uncertainty
- consider upside as well as downside
- be comprehensive – applied throughout the organization
- Break down barriers and silo mentality
Why the need for ERM?

- Sustain competitive advantage
- Expand or improve corporate governance
- Better understand risks from all sources and their interdependencies
- Eliminate unnecessary controls and improve on existing controls
- Improve risk management capabilities
ERM – A Long Journey

ERM is a multi year journey requiring ongoing assessment of:

• Where are we now and where are we going in the future?
• Are we staying ahead of evolving legal, regulatory corporate governance changes?
• What approach is most appropriate for my company’s risk profile and culture?
• What practical tools and methods can we use to extract tangible value?