Institute of Actuaries of Australia

Enterprise Emerging Risk Management

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Abstract

Emerging risks have considerable uncertainty not just in relation to impact and timing but also whether a risk will eventually materialise at all. For this reason they can escape the traditional risk management framework; however, their potential impact to an organisation should not be underestimated.

The purpose of this paper is both to raise awareness of the importance of emerging risks, and to propose a solution: a framework for their effective management. Risk management frameworks typically begin with setting risk tolerances; then risks are identified, assessed and risk management actions defined to ensure risks stay within the specified tolerances. A key difference for emerging risks is that it is very difficult to set tolerances to risks that are effectively unknown.

The early identification and management of emerging risks can have a significant impact on the long term success of the enterprise. The specific context of the enterprise, both internal and external, and the risk management culture need to be considered before these risks can be effectively managed. The authors propose an Emerging Enterprise Risk Management (EERM) framework, within the broader context of Enterprise Risk Management (ERM). This framework includes seven key steps:

(1) Establishing an understanding of the context (internal and external), and the impact and influence of the organisation's stakeholders;
(2) Identification of potential emerging risks;
(3) Analysis of identified risks incorporating both quantitative and qualitative viewpoints;
(4) Integration of risks to give an enterprise view;
(5) Assessment and prioritisation of risks, considering the importance of the relevant risks to the specific strategic positioning of the enterprise and its stakeholders;
(6) Treatment and exploitation of risks, in line with the enterprise's strategy and risk appetite; and
(7) Ongoing monitoring of emerging risks and feedback into each stage of the process, as well as review of the framework itself.

Communication is a key theme throughout the framework. The management of emerging risks should be both inward and outward looking, and involve communication at all levels of an organisation; the risk culture of the organisation needs to be active and receptive for the EERM process to be successful.

The EERM framework goes beyond the typical actuarial toolkit and its application allows actuaries, and other professionals, to add significant value to the risk management function.

Keywords: emerging risks; enterprise risk management; actuarial control cycle; framework; Enterprise Emerging Risk Management (EERM)

Contents

1 Introduction

This paper recommends that emerging risks must be built into an organisation's Enterprise Risk Management (ERM) structure. A standard ERM framework is proposed, however the focus is purely related to emerging risks. The framework described is applicable to any organisation, in any industry, although the key focus is on general insurance. We propose a framework rather than specific actions, however the framework needs to be applied actively. While a robust framework which identifies and manages emerging risks does not guarantee an optimal outcome for every new risk which may emerge, the organisations which identify and mitigate (or exploit) emerging risks early will be the ones which prosper the most.

The framework proposed in this paper is a systematic and comprehensive approach to identifying, assessing and responding to emerging risks and follows the Enterprise Risk Management framework set out by the Casualty Actuarial Society. Since emerging risks can affect several parts of an organisation, it is important to take an enterprise-wide view of them. As such, we term the process Enterprise Emerging Risk Management (EERM).

1.1 Why consider emerging risks?

Emerging risks have shaped and changed organisations. Emerging risks encapsulate the essence of ERM - the idea of a true enterprise-wide management of major risks. Despite this, in many organisations' ERM, emerging risks are not systematically addressed. Widely publicised, asbestos related diseases have generated a high number of insolvencies in various economic sectors, for about half a century. The insurance sector was not spared and high profile markets such as Lloyd's underwent a major restructuring exercise with the spin-off of reserves prior to 1992 (Equitas). More recently, AIG and Swiss Re, two giants in their sectors, suffered financial difficulties with issues linked to Mortgage-Backed-Securities. With bailouts in the trillions of dollars, some hard lessons have been learned. Regulators and rating agencies increasingly recognise the value of proactive risk management and preparedness. Emerging risks may not be newsworthy today but could be in the headlines tomorrow and ultimately on the epitaph of your organisation's tombstone. In the short term, an organisation could do well whilst still ignoring emerging risks. Or is that so? In the last decade we have seen the World Trade Centre terrorism attack, which resulted in significant business interruption; the closure of European airspace following the eruption of the Eyjafjallajokull volcano in Iceland, leading to major disruption for many airlines; and a near collapse in bank lending leading to severe liquidity issues for many individuals and businesses. Emerging risks are not infrequent or inconsequential.

Managing emerging risks generates a long-term competitive advantage for an organisation. Emerging risks can materialise very quickly, and ignoring emerging risks is akin to playing Russian roulette. This is not in the interest of external stakeholders, including shareholders and customers. In the short term, the cost of managing emerging risks may seem to exceed the benefit which, in turn, may make it difficult to obtain buy-in from internal stakeholders. Again, however, conventional wisdom needs to be challenged. One element of ERM is to build a risk management culture and, at the present time, this means a change of culture for most organisations. Internal and external stakeholders, therefore, need to be active in ensuring that emerging risks are part of management's strategic planning.

Importantly, managing emerging risks does not just entail minimising the impact of any downside, but also includes maximising the positive impact of any potential opportunities an emerging risk may present. For example, the advent of technology can create opportunities to lower expenses and the costs of running an organisation.

1.2 What is Enterprise Emerging Risk Management?

Within this paper the term "risk" is used to refer to a situation which has an uncertain outcome. Risks can be viewed as falling across a spectrum from those with fully known loss distributions, to those which are known but have uncertain loss distributions, to those which are not currently known to exist. We define emerging risks to be those which sit toward the unknown end of this spectrum. An emerging risk is a risk which may, or may not, materialise and if it does, then the impact is typically uncertain. Once a risk is known to have impacted an organisation then it is an "emerged risk". Whilst this paper focuses on the management of emerging risks, once a risk has emerged it must continue to be managed under the organisation's ERM framework.

Enterprise Risk Management (ERM) is defined by the Casualty Actuarial Society as "the discipline by which an organisation in any industry assesses, controls, exploits, finances and monitors risks from all sources for the purpose of increasing the organisation's short and long-term value to its stakeholders."

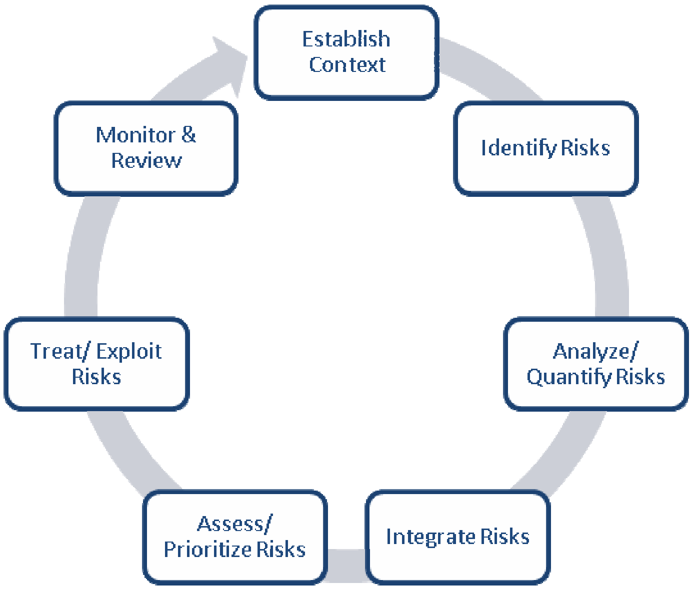
We define Enterprise Emerging Risk Management or EERM, the management of emerging risks in an ERM context.

1.3 EERM framework

The framework or structure for managing emerging risks should be simple and easy to understand and apply. This paper describes the steps of such a framework. While this provides a valuable and necessary background, practitioners should focus on the key aspects of each step.

There are several ERM frameworks which have been developed. The framework in this paper is based on the CAS ERM framework as shown in Figure 1.1. Any framework must account for the nature of the task before being applied. The CAS framework is comprehensive and well established, and in this case the main adjustments needed centre on the nature and level of focus at each step. Whilst the steps listed form a sensible process, the steps do not necessarily need to follow sequentially, and ultimately the process should be interactive.

Figure 1.1 – CAS ERM Framework

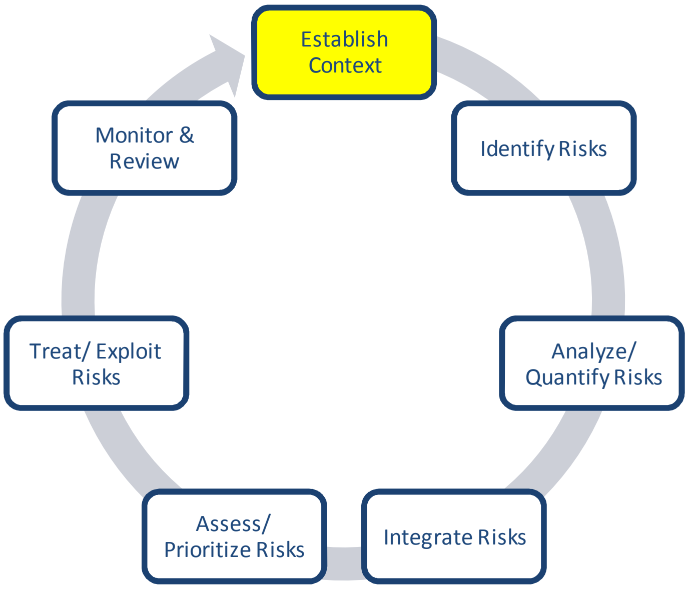


Throughout this paper we will refer to an example of implementation of the framework described.

Colin is a qualified actuary with 10 years of post-qualification experience. He recently took the role of Approved Actuary (AA) and Chief Risk Officer (CRO) at XYZ, a large multi-line general insurance company.

At XYZ, the existing ERM framework covered Insurance, Market, Credit, Operational and Strategic risk categories, risk to reputation and dependencies between these categories. There was, however, no specific mention of emerging risks. Colin's first priority as CRO was to implement a framework to manage emerging risks.

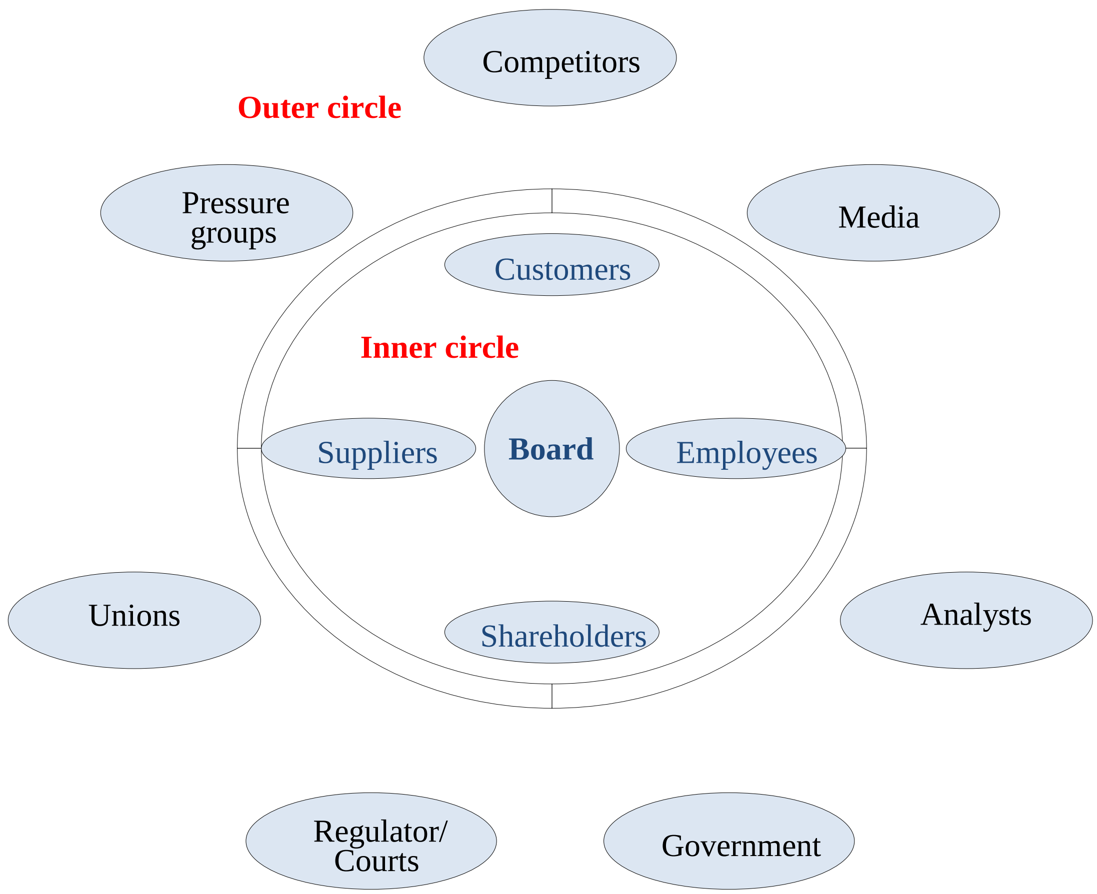
2 Establish Context



The current context (internal and external) of the organisational situation should be considered before embarking on applying any ERM framework. For the emerging risk framework proposed here to succeed, the vision and objectives of the organisation need to be considered, and high level support for the project is required to ensure that it is treated with sufficient importance.

The organisation's stakeholders need to be considered and they can be both internal and external. Figure 2.1 shows a high level overview of potential stakeholders. It may be appropriate to map, or at least to understand, the influence and importance of each of these stakeholders. Then, as far as possible, the most important and influential stakeholders should be made aware of the importance of the management of emerging risks such that they ultimately buy-in to the concept.

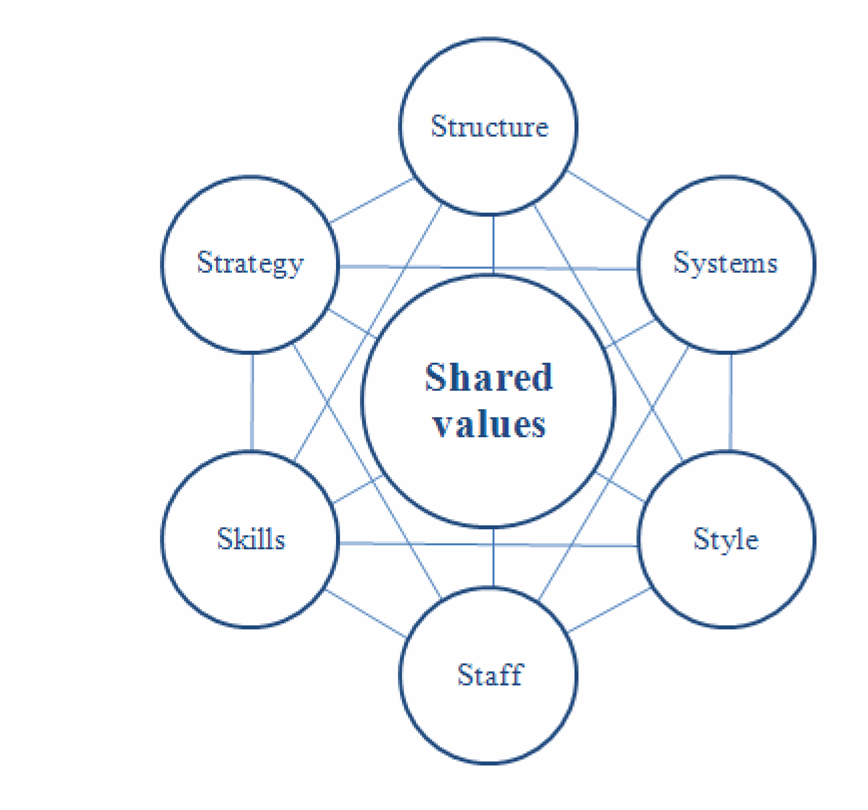
Figure 2.1 - Stakeholders



2.1 Internal Context

There are many internal frameworks that can assist in judging an organisation's readiness to change the way they manage risks. The seven "S" framework is illustrated in Figure 2.2.

Figure 2.2 – Seven "S" Framework



A brief description of the seven factors is outlined below. Note that the individual areas highlighted below are linked, and will be different for each organisation:

- **Strategy** - What is the strategy and risk appetite? Can risk be strategically avoided or exploited?

- **Structure** - The structure of the organisation, from a multinational global to a small local. Do the business units face the same issues? Do they currently communicate? Do they operate in silos?

- **Systems** - Do the current systems and procedures encourage the sharing of ideas? Will the data captured be adequate?

- **Style (Culture)** - How are things done? Is there a culture which fosters the openness to, and the sharing of, new ideas? Is the focus on day-to-day or long-term? Will allocating risk owners, an emerging risk sponsor or another authority figure be possible?

- **Shared Values** - How are common values communicated and built? Does the firm have an underlying common goal or is there conflict between business units? Will a common committee/forum approach be viable?

- **Skills** - Are the skills within the firm adequate to allow the implementation of an emerging risk framework? Will training be required?

- **Staff** - Will there be sufficient capacity and knowledge where the organisation needs them?

Through this internal analysis, it may seen that the organisation has the right people, process and platform to succeed or it may highlight areas for improvement before a framework can be implemented successfully. In addition to the internal context, the external environment is equally important, especially in the context of emerging risks.

2.2 External context

The business landscape is complex and dynamic and a good understanding of the external context is vital. Solutions may have dramatic impacts on reputation, profitability, business volume, and indeed the ongoing viability of the organisation. It is vital to understand and think through the potential ramifications of any proposed actions, or lack of, on relevant stakeholders. Competitor analyses or considerations of a product's competitive position may have to be considered as well.

- **Competitive considerations**

  The actions of competitors and their treatment of emerging risks can impact the actions which an organisation can take. In his 2009 paper *The Law of Risk and Light*, Ingram adapted Gresham's law "bad money will drive out good" to risk management . "For the most part, in most markets, participants are price takers, not price makers. And if someone comes into a market and is willing to accept a risk at half the going rate, then there is a new going rate Market participants who do see the risk can take the new going price or withdraw."

  Competitive issues also include the requirements of customers. Actions which reduce the (perceived) value of an organisation's product may result in the product no longer being viable. Alternatively, an emerging risk may present an opportunity to create a new product. Customers' interest in this new product is a key decider in whether it is a sensible avenue to pursue.

- **Legal requirements**

  The relevance of government intervention in the management of emerging risks varies by industry. Examples of potential areas to consider include: legality, competition regulation, employment law, accounting standards and prudential regulation for financial companies.

- **Investors**

  Capital providers may require minimum standards in the treatment of emerging risks. This may be driven by the expectations of external analysts from rating agencies and investment managers.

2.3 Risk management context

Understanding and managing emerging risks is a key component to an improved ERM framework. However, measuring these unknown or not fully realised risks may require an approach somewhat different from traditional risk measurement practices.

It is difficult to set risk tolerances for risks which are, for the most part, unknown. A feedback loop is needed between risk tolerances and the identification and assessment of emerging risks. Risk tolerances should also consider how emerging risks compare and/or combine with existing risks. The ways in which this interacts with strategy, competitive positioning and pragmatic decisions requires careful thought and assessment.

Internal context

XYZ is a well established personal lines insurer operating in Australia, with a strong culture where staff are recognised as the company's main asset. As a result, staff loyalty is high and most of the senior management have been with the company for many years. XYZ is targeting 5% p.a. real growth over the next five years which it intends to achieve via high retention of existing business and modest growth in new business. XYZ is currently reliant on local brokers and intends to continue with this as the main distribution channel.

There were a range of initial hurdles which Colin faced before developing and implementing the EERM framework. One was the flexibility of the key IT systems. XYZ's system did not allow for detailed data capture about the nature of claims and proper interrogation of that data. The development of the system was needed to allow for a new claim type and a short but precise description of claims.

Another initial hurdle was gaining buy-in, and the investment of time, from other executives and key staff in the company; particularly those with responsibility for premium income, as they initially saw this as an impediment to doing business. This hurdle was addressed, at least in part, by focusing not just on the down-side of emerging risks, but also the opportunities they present.

External context

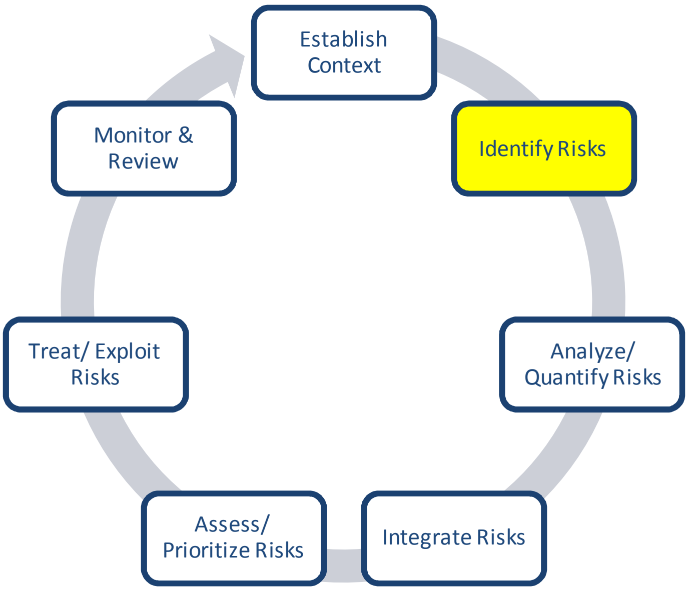
XYZ operates in a very price competitive market and has a large reliance on brokers.

The local regulator does not make specific recommendations on the management of emerging risks. They do, however, set out qualitative requirements for the governance and risk management of insurers and can be considered as implicitly covering emerging risks.

XYZ are very concerned about their rating as it impacts their ability to raise capital. When S&P conducts an ERM review, one of the categories assessed and scored is emerging risks management. Common factors which are viewed favourably include:

- Formalised environmental scanning processes;
- Regular communication and information sharing among all risk and risk control areas;
- Early warning systems and metrics; and
- A track record of timely response to recently emerged risks (e.g. credit/ financial crisis).

3 Identify Risks



A key step in the emerging risk management framework is the identification of potential emerging risks. The emerging risk framework needs to start with the premise that an emerging risk could come from anywhere, at any time. Regular horizon scanning, covering the full field of emerging risks over a suitable time horizon, is crucial.

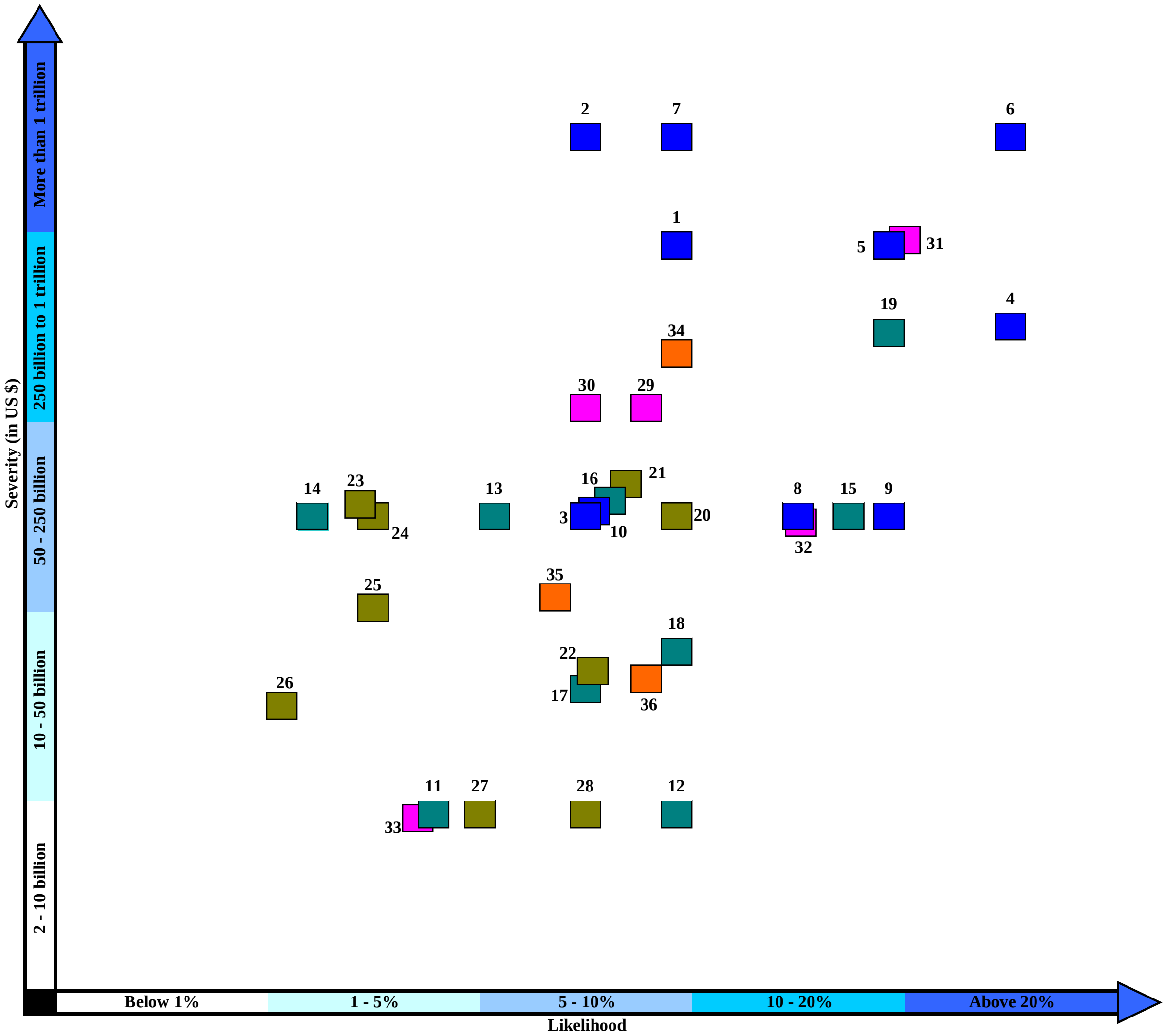
Identification would usually focus on emerging risks which could have an impact or implication for the organisation considered. Note that many emerging risks may not be relevant to the organisation, and these risks need not be included in the list. When in doubt, one would typically include them. Selection and prioritisation of emerging risks will be subsequently described as another step in the process.

3.1 Sources of emerging risk

There is no unique taxonomy of risk and there are various ways to categorise them. What is important in any classification of risks is that it encompasses all potential risk sources. It is important to note that an emerging risk can occur from any of these high-level groups (or indeed a combination of them).

Figure 3.1 sets out an example of a PESTEL analysis applied by the World Economic Forum (WEF). PESTEL stands for Political, Economic, Social, Technological, Environment and Legislative. It is a strategic planning technique that provides a useful framework for analysing the environmental pressures on a team or an organisation and can be adapted to identify emerging risks. A PESTEL analysis can be particularly useful for groups which are inward-looking.

Figure 3.1 – WEF PESTEL 2010



Source: World Economic Forum 2010

Economic Risks
1. Food price volatility
2. Oil price spikes
3. Major fall in the US $
4. Slowing Chinese economy (<6%)
5. Fiscal crises
6. Asset price collapse
7. Retrenchment from globalisation (developed)
8. Retrenchment from globalisation (emerging)
9. Burden of regulation
10. Underinvestment in infrastructure

Political Risks
11. International terrorism
12. Nuclear proliferation
13. Iran
14. North Korea
15. Afghanistan instability
16. Transnational crime and corruption
17. Israel-Palestine
18. Iraq
19. Global governance gaps

Environmental Risks
20. Extreme weather
21. Droughts and desertification
22. Water scarcity
23. NatCat: Cyclone
24. NatCat: Earthquake
25. NatCat: Inland flooding
26. NatCat: Coastal flooding
27. Air pollution
28. Biodiversity loss

Social Risks
29. Pandemic
30. Infectious diseases
31. Chronic diseases
32. Liability regimes
33. Migration

Technological Risks
34. Critical information infrastructure (Cif) breakdown
35. Nanoparticle toxicity
36. Data fraud/loss

3.2 External information

To create a list of emerging risks, one would count on both internal and external sources of information. Internal sources hold the knowledge of the operation, while external sources provide broad views on a large number of emerging risks. There may be risks which have already emerged in other parts of the world or different sectors, different populations or different companies but which have not yet affected the entity.

A useful starting point is industry specific sources of external information on emerging risks facing the particular industry of the organisation. Collaboration with industry working groups provides a potential source of input. This could include pooling of data and experience, sharing of ideas, and joint funding of research.

Broader sources not specific to a particular industry should also be examined, as they may consider issues which do not initially appear to affect the organisation but could have secondary implications. Broader sources also add to the information pool where industry sources could be lacking.

External sources include publicly available media, consultancies and academia. This includes scientific research which generates new knowledge on an emerging risk. Examples of external sources include:

- CRO forum: http://www.croforum.org/index.html
- International Risk Governance Council: http://www.irgc.org/-Emerging-risks,168-.html
- Oliver Wyman/FT 2010 Emerging Risk Survey: http://www.oliverwyman.com/ow/risk_survey_2010.htm

3.3 Internal information

Brainstorming and participation

Emerging risks is a field where market leaders can gain an edge over market followers. Brainstorming and a representative participation are necessary when creating a list of emerging risks. The key is ensuring that the net is wide enough from the start. A funnel model can help to ensure this, starting with absolutely everything that is possible and then funnelling down to those things that are more plausible and could have a material impact. A standard rule of thumb when generating innovation is that for every 100 good ideas, about 2 actually end up being realistic and viable. This is a good analogy for brainstorming on emerging risks.

Step 1 - Generate as wide a range of potential emerging risks as possible in a criticism free environment. No idea is rejected and no suggestion is filtered; participants are encouraged to 'think the unthinkable'. It could be desirable to survey a variety of activities in the operation.

Step 2 - Group or structure those ideas to look for links, themes and gaps. Further ideas may emerge and be added following this step.

Step 3 - Filter the grouped ideas to create a manageable list of risks. For example, a list in the hundreds could be reduced to a more reasonable list by excluding risks which would have no substantial impact on the operation. The quality of the list is about the quality of the ideas as a whole; quantity is not a requirement in itself. This step would usually involve discussions with various parts of the organisation to understand the ideas submitted and the risks perceived. The ideas which are not carried forward should not be discarded and some should be revisited next time the exercise is carried out.

Step 4 - Elaborate on the filtered ideas by creating a short description for each.

It is important to ensure that non-traditional sources of risks are considered and not systematically dismissed by taking a narrow view of risk.

Examination of emerging trends and data mining

To facilitate the identification of emerging trends within historical experience it is necessary to ensure that adequate systems and reporting processes are available. Importantly, data collection and data capture need to be revisited to ensure they meet the requirements for identifying emerging risks and this would typically mean that they need to be improved. Improvement in data collection and capture is likely to benefit other parts of the organisation, not just those concerned with identifying emerging risks.

Methods to interrogate data can vary from trend analysis to the simple detection of patterns, but it requires an inquisitive attitude and discussions with relevant employees or experts. As a general rule, the people "in the business" will have a good understanding of the types of risks being faced and issues arising.

3.4 Communication and reporting

A crucial element in identifying emerging risks is to ensure regular engagement and communication across the organisation as well as regular updating of the register of potential emerging risks.

Another key element is the education of staff to maximise the awareness of emerging risks. Are front office employees open minded and willing to consider the wide range of sources of risk? Are they established enough to pick up on emerging trends amongst the sea of claims data and metrics which are often not pointing towards emerging trends identification? The emerging risk management framework needs to challenge the norms and staff must be skilled, trained and motivated to think in this way. In other words, there needs to be a culture which supports the identification and reporting of emerging risks.

To generate ideas Colin used the PESTEL framework. Representatives from underwriting, claims, actuarial, finance, HR, IT and risk management were invited to a workshop where they were prompted to consider emerging risks from each of the six sources.

The ideas generated were then mapped into: Insurance, Market, Credit, Operational and Strategic risks, and risk to reputation. Risks identified can come from one or a combination of these broad groups. For example the emergence of a new infectious disease could have an impact on investments, insurance claims and the company's ability to function. The potential impact on many areas highlights the importance of taking an enterprise view of emerging risks.

In addition to this, and the sources mentioned in Section 3.2, Colin also identified insurance specific sources of research on emerging risks:

- Lloyds: http://www.lloyds.com/The-Market/Tools-and-Resources/Research/Exposure-Management/Emerging-risks/Emerging-Risk-Reports
- International Network of Actuarial Risk Managers: http://groups.google.com/group/inarm-emerging-risks/web/inarm

To make sure that internal data was as useful as possible Colin did a full review of all internal data systems and processes to ensure they facilitated the identification of new trends. Colin also introduced a new role in his team to analyse the outputs of these systems and purchased data mining software to further this.

To fully exploit internal knowledge, Colin also set up an emerging risks section on XYZ's intranet which incorporates an electronic suggestion box, which all employees can use to post any suggestions they have on emerging risks to consider.

All of these sources are used at the quarterly emerging risks workshops which include representatives from all of the areas of the business. The outputs of the analyses of internal and external information are circulated to all participants in advance of the workshops and the first part of each session involves a 'no holds barred' brainstorming exercise where each attendee adds any further potential emerging risks which are triggered by this information or indeed from any other source.

Based on the outputs of the workshop the register of potential emerging risks is updated on a quarterly basis. This register is available to all employees via the emerging risks section of the intranet.

The initial register contained 42 distinct emerging risks.

4 Analyse/Quantify Risks

This step involves estimating the impact of each emerging risk and requires a deeper understanding of the emerging risks in question. It is possible, if not likely, that existing knowledge will not be sufficient to form a robust basis for the evaluation of every emerging risk. Further research is needed and, as in Section 3, this research should use both internal and external sources. Knowledge can be drawn from both pre-existing research and specifically commissioned projects, for example a study into the health impacts of a potential carcinogen.

The emerging risks quantification focuses on the order of magnitude, rather than exact estimates. Emerging risks cannot be quantified with anywhere near the level of confidence as claims toward the known end of the spectrum. By its nature, the estimation of emerging risks will be based on judgment and subjectivity. However hard it is, it is necessary to estimate the order of magnitude of emerging risks in order to prioritise and process them to an appropriate extent.

It is important to effectively communicate the uncertainty in such estimates, the limitations of the analysis, and the underlying assumptions. Arguably much of the Global Financial Crisis was caused by a lack of risk understanding and by people not paying attention to the assumptions and limitations underlying the pricing models being used.

4.1 Characteristics of the risk

A qualitative understanding of the risk should be sought to complement any quantitative view on the potential impact. Factors to consider in understanding the nature of the risk include:

- the cause of the risk;
- the nature of the consequences; and
- the speed and duration of impact.

While sudden shocks can have a huge impact, be they serious geopolitical incidents, terrorist attacks or natural catastrophes, other big risks facing the world today result from slow failures or creeping risks (asbestos related disease is a good example of this creeping effect). Because these failures and risks emerge over a long period of time, their impact and long-term implications can be hard to quantify and have typically been vastly underestimated in the past.

4.2 Impact of the risk

The causes of emerging risks often stem from external sources, whilst what is of most interest is the impact on the specific organisation. To understand the potential impact on an organisation we first need to understand the impact on the macro scale. Once the big picture is understood, the impact on the specific operation, and then on any units within the operation can be examined. As for risks to the reputation of an organisation and strategic risks, statistical analyses are rarely suitable for modelling individual emerging risks, principally due to the lack of relevant data. In quantifying these risks, it is most important to have a broad understanding of the impact – will it break the company or will it have a slight impact on this year’s profit? Statistical modelling of individual emerging risks, if used, should not restrict the analysis to a narrow view of risk.

In practice, the estimation is often limited to the severity of the emerging risks. For frequency, a simplistic low/medium/high category might be developed. When frequency is estimated, the frequency and severity can be plotted on a risk map, as in Figure 3.1. Both the estimation of the severity and frequency require expert judgment and can often be improved via discussions with others. There are various techniques available including:

- **Scenario analysis**: With a scenario analysis, a particular set of circumstances are declared to have happened and the consequences of those circumstances are developed. In the absence of historical data, expert opinion is typically used in designing the scope of the scenario and its impact. A probability may also be attached to each scenario. When relevant, stress testing of existing models using the scenario assumptions can help to understand the potential impact of the adopted assumptions.

- **The Delphi technique**: The Delphi technique is a method for extracting expert opinion based on the assumption that group judgments are more valid than individual judgments. A group of independent experts or managers is requested to make estimates of the likelihood and impact of events. The experts answer questionnaires in several rounds. After each round a facilitator provides a summary of the experts’ forecasts from the previous round as well as the reasoning they provided for their judgments. Experts are encouraged to consider the replies from other members of the group from previous rounds, both quantitative and qualitative. The aim is that during this process the group will converge towards a consensus, and that consensus is a closer match for the true underlying answer.

- **Prediction markets**: Prediction markets are speculative markets created for the purpose of making predictions. Assets are created whose final cash value is tied to a particular outcome. The current market prices can then be interpreted as predictions of the probability of the event or the expected value of the parameter (e.g. credit default swap to assess credit risk). Participants who buy low and sell high are rewarded for improving the market prediction, while those who buy high and sell low are punished for degrading the market prediction. Evidence so far suggests that prediction markets are at least as accurate as other institutions predicting the same events with a similar pool of participants. Prediction markets have been used in many areas including sales forecasting by Hewlett Packard, sources of new business ideas by GE, and the technique was even proposed by the US Department of Defence as a method of identifying potential terrorist attacks before a critical backlash forced them to withdraw the idea.

For XYZ, emerging risks have implications for pricing, reserving, asset allocation and capital adequacy. Some of these items could generate a stressed situation for the company, such as a sudden increase in reserves or a greater capital requirement. As the Appointed Actuary, Colin was aware of the issues in these areas and is keen to make sure that they are appropriately addressed.

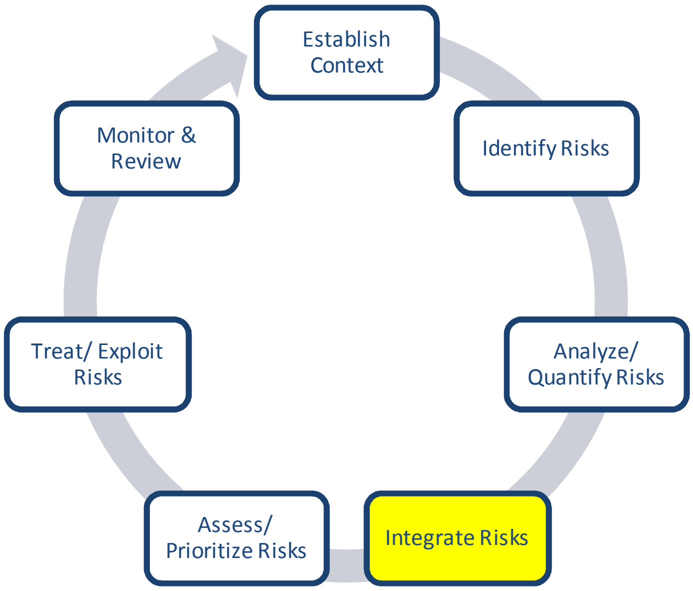
Within reserving and reserve variability, emerging risks should be considered. XYZ had a small exposure to asbestos related claims and these formed a modest proportion of the reserves. The high degree of uncertainty in the final output had a more material impact on XYZ's probability of adequacy though.

In many instances, key emerging risks have limited effect on the expected values of outcomes but have a greater impact on the tail of the distributions. The impact on pricing may be sufficiently modest but the impact on capital adequacy could be significant. Analysis performed for capital management should ideally be consistent with pricing.

Further to the analyses mentioned above, Colin commissioned specific research into the emerging risks identified previously. This focused both on understanding the nature of the risk and also on identifying the potential impact in certain scenarios. This developed an understanding of how a pandemic could affect the company, including what potential impacts could be, how quickly they could emerge and how long they could last. Once this understanding was established, representatives from underwriting, risk management, HR, claims and actuarial worked together using the Delphi technique to produce financial estimates for several pandemic scenarios.

Colin made sure that all the analyses mentioned above fed into the EERM framework in a consistent manner, both in terms of using the analyses to feed into the risk management processes and also in ensuring that further analysis done within the risk management team fed back into the actuarial work of pricing and reserving.

5 Integrate Risks



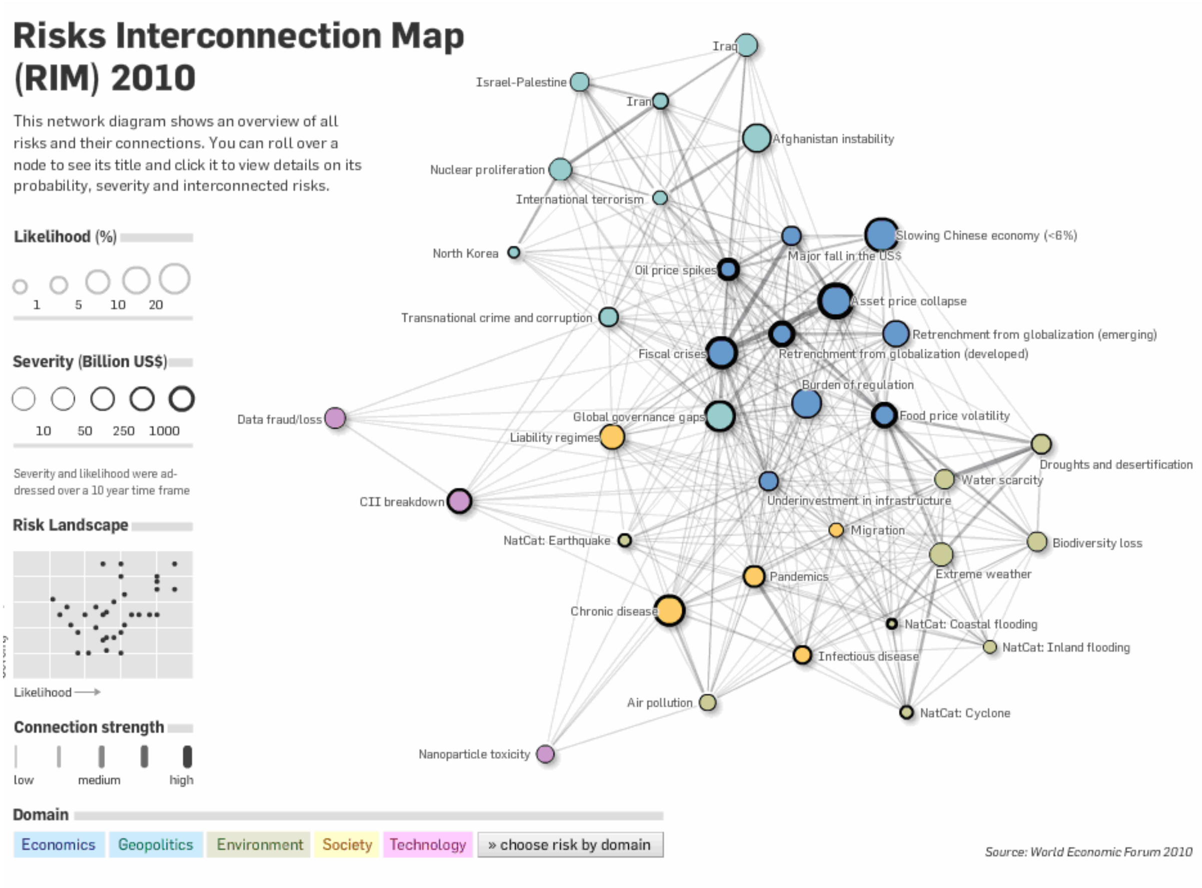
In this section we consider the integration of risks, meaning the impact of risk on the entire business, allowing for inter-connections.

5.1 Inter-connections

An important element of emerging risk analysis is understanding the ways in which known and potential risks interact and their potential impact on different parts of the business. Unexpected dependencies should not be underestimated as a single source of risk could manifest itself in many areas - each of which may be manageable if taken alone but the aggregated impact on the organisation may be far greater. Seemingly small exposures can combine into a large impact if underlying risks are strongly correlated. Consideration should be given to dependencies between areas of a different nature such as assets, liabilities and operations. This could unveil the true impact or scale of the risk.

Understanding inter-connections is increasingly important as the world continues to become more inter-connected. The Global Financial Crisis is an example of how an event can impact several countries and economic sectors at the same time. The World Economic Forum has, for the past five years, produced annual reports and plotted the inter-connectedness of many identified risks. A similar process could be carried out at an organisation level, with the expectation that many of the risks identified in Figure 5.1 below would not be applicable to all organisations.

Figure 5.1 - Risk interconnection



5.2 Modelling inter-connections

It is important to ensure that the emerging risk process does not jump to the quantification stage without due consideration to the causes of inter-connections, and what can be managed and quantified without complex modelling.

There are several ways to attempt to model the interactions including structural dependencies, correlations and copulas. An unrealistic model of dependencies may have a large impact on the view of an emerging risk. The modelling of dependencies is an imprecise science in almost all fields due to the large volumes of data required, which are rarely available, especially for emerging risks. The approach here needs the support of the business and the views of the business should be reflected in the resultant modelling. For example, this may result in non-complex modelling such as a deterministic scenario or a factor-based approach.

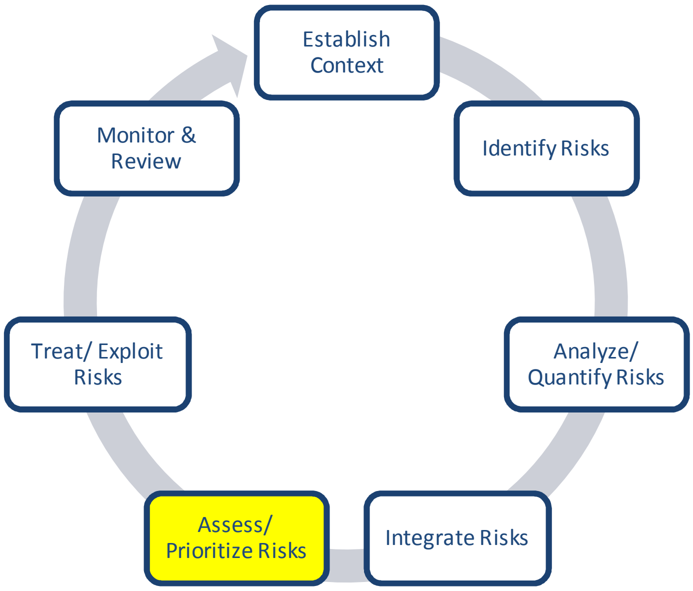
Another important element of emerging risk analysis is understanding the ways in which known and potential risks may interact and impact different parts of the entity’s business.

As an insurance company there was a tendency to focus on claims risks. Colin noted that the discussions about pandemic risk had tended to consider the claims risks and not the risks to other elements of the business. Whilst XYZ could be exposed to significant losses in their sickness and accident portfolio, the cost was comparatively small compared to the potential impact on the organisation if it were to cease operation during such a crisis.

Thus, pandemic scenarios were identified and the impact on each aspect of claims costs, assets and operations were separately considered. Once this was completed, the team met and discussed how each component might interact with each other. It was clear from these discussions that assumptions about the impact on claims costs had assumed that the business operations were running as normal and that this was unrealistic in the situation of a large, widespread pandemic. Integrating the impact of a pandemic led to a significant increase in the estimated impact of a pandemic on the business compared to the sum of the impacts considered in isolation.

The understanding of dependencies and interconnections developed through this process was also fed back into the modelling of risk margins on XYZ's reserves, and into the internal capital models.

6 Assess/Prioritise Risks



6.1 Assess

Assessing involves pulling together all of the work so far, to understand the emerging risks identified and their potential impact to the aggregate risk profile. The assessment should cover a number of factors such as their aggregate severity, likelihood, qualitative criteria and what it means to the overall operation.

Phantom risks should be identified and excluded. A phantom risk is a perceived risk that never impacts the organisation in that it does not eventuate or if it does occur then it has no impact on the company's operations. Phantom risks include "conspiracy theory" type risks i.e. those risks that are raised as having potential but do not have any credible evidence to support the claim – an example might be cancer caused from eating food cooked in microwave ovens. Because phantom risks do not lead to an impact their inclusion can dilute the attention that should be paid to the true emerging risks, which can occur in two ways:

- Time and effort is spent analysing a risk that will not occur;
- Individuals lose interest in, and support for, the EERM process because time is wasted on improbable risks.

6.2 Prioritise

Any organisation will have a finite pool of resources with which to manage and exploit risks. A risk versus benefit analysis is a key tool which enables a sensible allocation of resources to any given risk. Prioritising emerging risks from the entity's perspective requires careful consideration of the significance of the risk to the entity and its stakeholders. This should ideally be aligned with the strategic goals of the organisation. In fact, the process is likely to benefit substantially from the involvement of members of senior management who have an understanding of the strategic positioning of the company.

Colin pulled together the information gathered so far onto the emerging risk register. The register contained qualitative and quantitative information on each risk identified. For illustration, an extract from the register is shown below:

Emerging Risk	**Issue**	**Assets Impact**	**Liabilities Impact**	**Operations Impact**	**Emergence Stage**	**Priority**
Asbestos	Found to have caused lung-related diseases and other complications	Unlikely	Yes	Unlikely	Fully	Low
Climate change	Potential for increased natural disaster activity	Yes	Yes	Yes	Early	Medium
Genetically modified food	Appear in food, pharmaceuticals and other products. Potential that insured unknowingly incorporates into its product	Unlikely	Yes	Unlikely	Early	Medium
Nanotechnology	Uncertainty as to the possibility and to what extent nanoparticles can be harmful to humans, other forms of life and the environment	Yes	Yes	Yes	Early	Medium
Pandemic	Can result in business interruption, quarantines, loss of life, claims and so forth	Yes	Yes	Yes	Partly	High

After assessing the emerging risks and gaining an understanding of them, both quantitatively and qualitatively, and considering the inter-connections, Colin and the team decided that the first one to tackle was a major pandemic.

7 Treat/Exploit Risks

Having an understanding of which risks may emerge and what their impact could be is of huge importance to any organisation. What is ultimately important, however, is to the actions taken to manage these risks. Identifying and analysing potential risks but then doing nothing about them is like seeing your ship approach an iceberg but not taking any evasive manoeuvres. The risk owners should be clearly identified (in some countries it may, by law, be the board of directors) and have the ultimate responsibility and authority to manage the risk.

The decision of how to respond to emerging risks should tie in closely to the internal context and risk management context, as mentioned in Section 2.4, including the strategy and risk appetite of the organisation. Managing emerging risks does not just mean avoiding, reducing or mitigating them. It is also about optimising the potential reward for a given amount of risk. In general, every emerging change to the environment produces opportunities for competitive upside as well as downside.

7.1 Responses to risk

There are a variety of potential responses to risk to select from. Some of these responses can complement one another. The main responses to risk are:

Manage exposure:

- Avoid/deal with a specific industry
- Limit/Increase aggregate exposures to a specific industry
- Monitor exposure regularly to ensure that it remains within the limits set

Manage impact:

- Mitigate or hedge, e.g. via insurance
- Transfer or share with a third party

Exploit:

- Create a new product which helps customers deal with the potential risk
- Accept and retain the risk

A clear understanding of emerging risks provides the opportunity for their exploitation. If competitors are unsure about a risk and you understand it well and know there is little risk, then you could offer a low risk product. Likewise if the profit is greater than the expected losses and the potential impact is within the risk tolerance of the organisation then there is no reason not to retain the risk, subject to regular monitoring to ensure that action is taken if the view changes. It may be that uncertainty on the part of competitors leads to them withdrawing, or increasing prices beyond the cost of the risk. Alternatively, the upside may be that competitors are affected by the downside, distracting them from their core business strategy.

The treatment of one risk may have implications for the management of other risks (emerging or otherwise). The full impact of the treatment of a risk should be considered, including any potential side effects.

7.2 Communication and reporting

Actions taken to manage emerging risks should be consistent across the organisation; there would be little point in one business unit avoiding a particular potential risk source only for another business unit to actively take this risk on. It is crucial that emerging risks are managed within an enterprise risk management framework and that isolated business unit actions are avoided. A good way of supporting this is a regular report summarising the outputs of the EERM process and agreed actions to manage particular emerging risks.

Educating risk owners on emerging risks is an important component of the implementation of an emerging risk framework. Implementation of management actions will require the buy-in of senior management, risk managers and risk owners across the business.

7.3 Preparedness

Response planning is a key aspect of preparedness. Having clear plans in place for reacting to any changes caused by emerging risks, whether identified within the EERM process or not, is crucial due to the speed with which risks can emerge. Preparedness includes identifying, and allocating adequate levels of sufficiently skilled resources to monitor emerging risks and carry out the response plans should the risk emerge. Organisations can also set up emergency rooms at the time of a crisis, as evidenced during the Global Financial Crisis and these should be included, if applicable, in any response plans.

Dry runs, for example disaster recovery testing, provide a good test of the plans. The dry run might be oriented to an incident that hits suddenly in a compressed time frame. It will test several business units in the organisations. A debrief on what went well and what should be improved would allow an assessment of the effectiveness of the plans.

Having identified pandemic as the most important emerging risk facing XYZ, Colin took several actions to manage this risk.

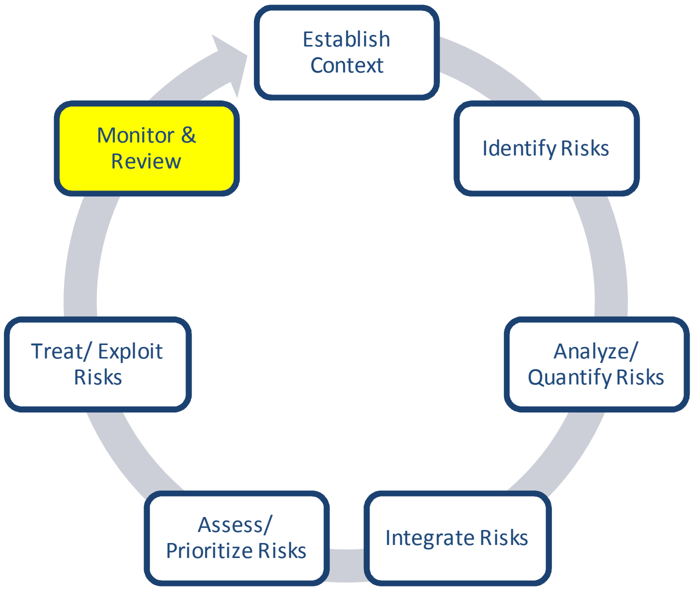
As an insurer, XYZ was willing to accept insurance risk as long as it is reasonably priced. Customers and competitors were also worried about this risk after several scares over the previous decade. A number of competitors were excluding pandemic from their travel insurance policies. Given the nature of XYZ's travel portfolio and the countries which policyholders were travelling to, XYZ's scenario tests indicated that any losses would be well within the risk tolerance for insurance risk. XYZ followed the market in excluding pandemic from their standard insurance policy but also seized the opportunity and offered an additional single-trip policy for pandemic at a premium well in excess of that required to cover the expected cost of the risk. This cover was only available to clients purchasing the standard policy from XYZ. Travellers to certain countries which would have much higher costs in the event of a major outbreak were not offered the cover. Limits were set on exposure to pandemic policies, and exposures were monitored on a monthly basis to ensure that they remained within tolerance. As a result XYZ collected a significant premium pool for pandemic travel policies and also enjoyed a large increase in volume on their standard policy.

In step 6 Colin identified that a pandemic could affect XYZ in numerous areas simultaneously. As well as insurance risk other potential impacts would include business continuity risk and investment risk.

To address the business continuity risk, XYZ developed a crisis management plan which included identifying a minimum level of skeleton staff needed to operate remotely in the event of a pandemic, and having in place multiple backup staff for each position in several locations around the country.

Colin introduced a quarterly Emerging Risks Report which was provided to the Board and senior management. This report summarised each risk in the form of a dashboard including its expected likelihood and impact. The report also explained the process for monitoring identified risks and recommended responses should it materialise.

8 Monitor & Review



This step involves both monitoring emerging risks and reviewing the relevance and implementation of the EERM framework itself. The EERM framework is not intended to be followed once and then forgotten, that is, it is not a "set and forget" process. The process needs to be regularly followed, incorporating any lessons learned from the last cycle. New risks will emerge over time, further information may become available, and the organisation may change.

Crucial to developing an emerging risk management framework is to ensure that an ongoing process is implemented, with accountability by senior management, regular engagement and communication across the organisation and continual updating of the register of potential and key emerging risks.

8.1 Monitoring Emerging Risks

It is necessary to adequately monitor emerging risks, including emerged and partly emerged risks, and to provide targeted and timely feedback loops.

Emerging risks are different in nature to many other risks. As a general rule, an organisation will have limited data relating to an emerging risk. Thus, standard monitoring such as comparing experience against expectations could be of limited value. More important is the early recognition of newly emerged or about-to-emerge risks. As in Sections 3 and 4 (and indeed relevant to all sections), regular monitoring of internal data and external information are highly relevant.

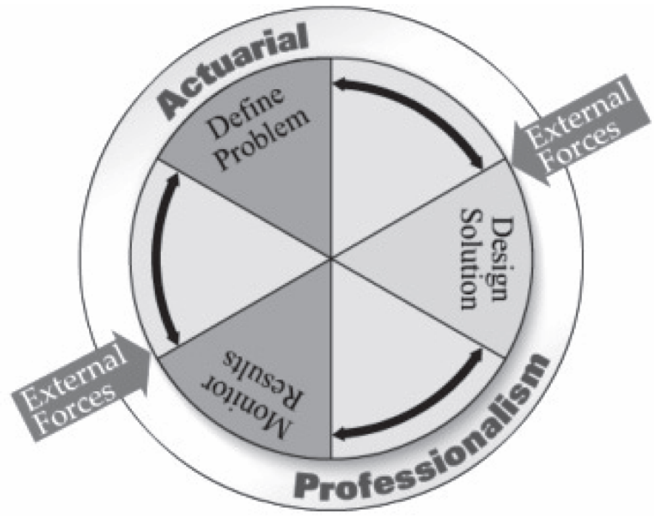
Prompt reporting of issues and early indication of trends is crucial. Regularly updated emerging risk dashboards provide an effective way of communicating and updating the emerging risk situation. The dashboards used should incorporate leading indicators which can provide early warnings of potential exposure or emerging issues.

Good communication with stakeholders will provide a stronger foundation for the ongoing relevance of the process. In addition, it provides a forum for training and development of staff in relation to their assessment and handling of risk. As a key source of risk to the organisation, emerging risks should be on the radar of the Board.

8.2 Reviewing the Emerging Risks Framework

In addition to the monitoring of emerging risks, it is also necessary to monitor the risk framework. The idea is to continuously improve the management of emerging risks. This involves the monitoring of each stage of the process and ensuring that the framework remains viable and relevant. The review must cover all aspects of the framework and the interactions of various elements of the framework need to be assessed. The actuarial control cycle provides a simple framework for doing this as shown in Figure 8.1 (sourced from the Institute of Actuaries of Australia's text book *Understanding Actuarial Management*).

Figure 8.1 – Actuarial Control Cycle



A list of key features of an emerging risk monitoring process, and the aspects which a review of an emerging risk framework must consider are provided in Appendix B. This list provides criteria against which to review the framework in place.

The EERM framework is updated on a quarterly basis in XYZ. Staff within the risk management team regularly monitor sources of external information and participate in an industry working group focusing on emerging risks. Internal leading indicators are monitored including quarterly exposure reports and claims extracts. The quarterly process includes workshops with key stakeholders and updating the emerging risk report including the emerging risk register and emerging risk dashboards.

The EERM framework is reviewed annually by a combination of risk management and audit teams. It is rated against the criteria in Appendix B. After the first annual review it was concluded that there were several stakeholders missing from the process and they were subsequently added. The emerging risk management report was found to be missing key information and it was updated to include this.

Appendix A – Bibliography

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Appendix B – Key features of an EERM framework

The key features of an EERM framework are:

- **Value creating** – unless the monitoring is seen by the stakeholders as adding value then it is unlikely to receive adequate attention;
- **Practical** – the process needs to be updated regularly and in a timely fashion without excessive resources. If the process becomes too complicated and inefficient then it is destined to fail;
- **Supported** – Support of senior management and risk owners is critical to the success of the framework. Whilst the framework should be efficient the organisation also needs to ensure that it is adequately resourced;
- **Timely** – reports should be able to be produced in a timely manner to ensure relevance of the information being provided and prompt action. The framework will, ideally, observe leading indicators in order to provide the early notification of emerging risks;
- **Comprehensive** –A broad focus, incorporating all sources of information and considering a wide range of expertise is key;
- **Relevant** – the monitoring needs to focus on material risks and avoid phantom risks;
- **Flexible** – the monitoring must react to changes in experience and have both a short and medium term focus;
- **Clearly and efficiently communicated** – to ensure a consistent, enterprise wide response to emerging risks the process must be clearly communicated across the business. Regular, comprehensive, clear communication and reporting are crucial.