Presidential Address 2010

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Quantifying Risk, Enabling Opportunity

A ramble through thought leadership

Books are one of the best routes into the realm of productive thought. Without doubt my favorite actuarial author is Frank Redington. If you have not done so yet, I encourage you to read his book *"A ramble through the actuarial countryside", in which* he exposes not only his brilliant mind, but also a wonderful way with words.

In his 1958 presidential address to the British Institute of Actuaries, Redington said: "T*he microscope and the telescope have their value. They analyze. But the natural eye has a more comprehensive field of vision. It synthesizes. Scientists are taught to keep the other eye wide open when using a microscope. Literally, it is good practical advice; metaphorically, it is a gem of wisdom*."

We actuaries love to analyse, but the word that Redington used that struck me most was synthesize. Synthesis is the process of combining simple elements into complex products. It is, in fact, the opposite of analysis. I think that actuaries do both, often simultaneously and sometimes producing complex, as opposed to elegant, solutions.

In this address I would like to synthesize, or combine some thoughts on actuaries and risk management.

Our Society's Vision and Mission

The context of what we do is provided by the Vision of the Society, which looks forward to "an actuarial profession of substance and stature, serving, and valued by, our stakeholders as a primary source of authoritative advice and thought leadership in the understanding, modeling and management of financial and other measurable risk".

The Mission of the Society is to:

- Ensure the relevance and enhance the role and reputation of the profession, both in South Africa and within the international actuarial community.
- Develop the expertise and skills of members and expand these to meet new opportunities as conditions change.
- Require that the professional conduct and skills of members meet the highest standards.
- Harness the expertise of our members to establish a position of thought leadership to inform public debate.
- Be a dynamic professional body of value to its members.

Our professionalism

Much has been said, and needs to be said, about improving the service and professionalism of the actuarial profession. Professional development is the focus of many new initiatives in the actuarial profession both globally and locally.

Our immediate past president, Garth Griffin, elaborated on this theme in his presidential address in 2008, where he described us as being a *"privileged profession"*. He went on to say that: *"The consequence of privilege is accountability; we must face, accept and embrace this accountability, at the level of both the individual and the profession as a whole. For, by avoiding it, whether directly or indirectly, we surely fail as a profession and, as importantly, both ourselves and those that follow us."*

So having had professionalism addressed so excellently by Garth, I would like to focus my thoughts on something else quite fundamental to the actuarial profession and that is thought leadership, particularly in the area of **risk opportunity**.

Our core skill set

Our core skill set is described in our vision as being *"a primary source of authoritative advice and thought leadership in the understanding, modeling and management of financial and other measurable risk".*

This is a powerful statement that has been developed by recent generations of our council members and presidents. Our core skills are described in a way that sets both the standard and direction for us as members of the actuarial profession.

The concepts contained in the vision statement give opportunity for endless thought, elaboration and research.

The central theme that I would like to explore further is both a significant issue as well as a huge opportunity for the profession: how do we provide thought leadership in the understanding, modeling and management of financial and other measurable risk, particularly in the area of enterprise risk management?

Actuaries are choice architects

In their book "Nudge", the authors Thaler and Sunstein (2008) develop a concept of a "*choice architect*" as somebody who has "*the responsibility for organizing the context in which people make decisions*".

There is much food for thought for actuaries in their book, but the essential idea is that the more complex the choices are, the more critical the role of the choice architect becomes. Actuaries are clearly choice architects who work most often in complex environments. We clearly frame the context of the choices made by our stakeholders. We therefore cannot walk away from the responsibility and accountability of providing the proper context and appropriate choices. That topic deserves its own body of research.

In the biblical book of Genesis, Joseph instructed the leaders to reserve and store food from seven abundant years to supply his adopted country with food during the coming seven lean years. He conveyed a simple choice: "store or starve". Was Joseph the first actuary?

Actuaries have a range of essential skills to help stakeholders make effective choices as they identify, quantify, manage, monitor and exploit risk opportunities.

Thought leadership

I have no option but to state the very obvious: Thought Leadership requires thinking!

Yes, but what sort of thinking? New thinking . . . thinking at the edge of the knowledge frontier . . . thinking that seeks out the new frontiers of knowledge . . . establishing new concepts for others to follow . . . applying familiar concepts to new fields . . . turning thought into robust and useful knowledge . . . establishing the reputation for being thought leaders in a particular field of knowledge.

Profound thought can often come from synthesizing or combining ideas from diverse sources. The actuarial profession can particularly benefit from looking into the work and thoughts from other disciplines. In the early days of modeling the HIV and AIDS epidemic, I spent more time with epidemiologists and health economists than with actuaries, which gave a unique perspective to the research and approach that eventually followed.

Research is the bedrock of thought leadership, but research can be conducted in many ways. It was Einstein who was famous for his "thought experiments". His concepts have spawned work for generations of scientists and led to growth in a multitude of scientific endeavors.

Thought leadership leads to growth. Growth only comes from two sources: new skills and/or new opportunities. It is part of the Society's mission to develop the expertise and skills of members and expand these to meet new opportunities as conditions change.

The most significant new opportunity open to actuaries is in the area of enterprise risk management, and its rather larger brother, systemic risk management. I would therefore like to share some thoughts on this topic.

Risk Opportunity

Redington again: *"I believe that a fruitful way to search for new insight is to refresh our thoughts with the basic facts and not to be too hasty to compress these facts into a single present value".* So, let us refresh our thoughts, start with the basic facts and disregard present values!

Risk provides the necessary environment for opportunity. A few obvious examples will suffice: pricing risk provides the opportunity for profit margins; distribution risk provides the opportunity for better distribution logistics and reduced costs; risk management provides the opportunity for a business to survive a crisis; new market risk provides profit margins for established businesses; imperfect knowledge risks provide the profit incentives for entrepreneurs; managing social risks provides the opportunity for increased tourism revenue, etc.

I have coined the phrase "**Risk Opportunity**" to describe more clearly what we are dealing with here. The phrase is intended to convey the joint concepts of taking the opportunity to manage risk as well as deriving opportunities out of perceived risk. This phrase is useful because, in my experience and by observation of human nature, individuals, management, directors and trustees will more readily worry about risk than contemplate opportunity. I would be interested to develop further thinking around this concept.

Actuaries are often accused of being risk-averse. That is not a particularly true or useful description. If we were risk averse, why on earth would we tackle such a complex field of endeavor? One could even argue that actuaries embrace risk!

The Society has adopted the tagline "Quantifying Risk, Enabling Opportunity". Let us be serious about this and contemplate and deal with both the risks and opportunities available for the benefit of our stakeholders.

Risk and uncertainty

Risk is clearly again very topical with respect to business and social issues today. This comes in the wake of recent acts of terrorism, tsunamis, earthquakes, volcanoes, changing weather patterns, dwindling natural resources, loss of biodiversity and financial crises at individual, institutional, national and even global levels.

While risk has suddenly come into sharp focus in the mainstream of business and society it is, of course, an old-fashioned concept for actuaries.

Society now demands that the risks be recognized sooner and managed better. In the business and financial sectors, regulators have responded to these new and emerging risks by requiring directors to manage the risk and sustainability of their enterprises. The new Companies Act and the King III code of corporate governance in South Africa are just such examples.

As an aside, looking across the business, regulatory and social landscapes today, there is another word that that appears frequently - sustainability. But sustainability addresses the risk of continuity of the entity and the environment for future generations of stakeholders. Now for actuaries, who deal often in the very long-term and think readily about the generational transfer of value and different cohorts of stakeholders, sustainability has always been a very familiar concept.

It is also necessary to digress here into a discussion on risk and uncertainty. These two concepts are particularly important when we look at the specific field of thought leadership we claim to pursue, that of understanding, modeling and management of financial and other measurable risk.

The economist, Frank Knight (1921), in his work Risk, Uncertainty and Profit, made a distinction between risk and uncertainty. He asserted that risk exists when a probability based on past experience can be attached to an event, whereas uncertainty exists when there is no objective way to place a probability on an event. To quote:

“. . . Uncertainty must be taken in a sense radically distinct from the familiar notion of Risk, from which it has never been properly separated. The term "risk," as loosely used in everyday speech and in economic discussion, really covers two things which, functionally at least, in their causal relations to the phenomena of economic organization, are categorically different. ... It will appear that a measurable uncertainty, or "risk" proper, as we shall use the term, is so far different from an unmeasurable one that it is not in effect an uncertainty at all. We ... accordingly restrict the term "uncertainty" to cases of the non-quantitive type”.

This is probably a useful distinction for actuaries. Another, more recent, approach on this issue has been described in the best-selling book The Black Swan, by Nassim Taleb. He asserts that “black swan events” are not capable of prediction because they occur so infrequently, but they are events of such magnitude that they swamp all other measureable risk. Writing in the New York Times in April 2007, Taleb said:

> *“What we call here a Black Swan is an event with the following three attributes. First, it is an outlier, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility. Second, it carries an extreme impact. Third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable. I stop and summarize the triplet: rarity, extreme impact, and retrospective (though not prospective) predictability. A small number of Black Swans explain almost everything in our world, from the success of ideas and religions, to the dynamics of historical events, to elements of our own personal lives.”*

Taleb is clearly thinking about uncertain events. Nevertheless, if what he asserts is true, it has significant implications for actuaries and risk opportunity management and, in particular, our fundamental approach to modeling risk. There is definitely a need for more actuarial thinking and research in this area.

The fact that The Black Swan became a best-selling book around the world is also a reflection of the interest and importance placed on risk in mainstream thinking today.

Risk Opportunity is core actuarial work

Risk opportunity certainly lies at the core of actuarial work. Yes, we are mathematicians, but primarily mathematicians specializing in probability. If there was no risk of an uncertain outcome, there would be no use for probability theory.

Furthermore, risk is only of interest because of choice and uncertainty. If one has all the facts, no decision is required; it is simply a logical conclusion.

The inability to manage personal risk, led originally to the need for risk pooling. The need to manage risk pools led to the need for actuaries. The risks actuaries traditionally managed or advised on were those of mortality, morbidity, longevity, health, and financial and material loss.

Although the participants in the risk pools participated to limit and manage their personal risk, at the level of the risk pool, the risks that need to be managed were primarily those of solvency and financial soundness. These risks included the need to match assets and liabilities and cash-flow over time.

These are just a few of the risk-related questions that actuaries have attempted to answer: What is the risk of death or survival? What is the pricing risk? What is the investment risk? What is the risk of retiring without a fixed income? What are the likely health risks and the cost of healthcare? What can be done to limit the impact of disability on earnings ability? What is the risk of material loss? What is the possibility of catastrophic loss? What is the risk of insolvency under adverse conditions? What is the risk of an epidemic? What is the risk of stochastic outcomes over time? What is the risk of mis-matched cash flows? What is the risk of excessive – or insufficient - surplus distribution? What is the risk of asset failure? And, for each one of these questions, what are the opportunities created by managing these risks?

However, as Redington reminded us earlier, compressing complex facts into a single present value does not produce insight. This is never truer than in the area of enterprise risk management.

What is Enterprise Risk Management (ERM)?

“Is there anything new under the sun?” to quote another biblical book, that of Ecclesiastes.

The thinking about ERM has developed over a number of years. This thinking has not only been lead by the actuarial profession whose focus has to date been more on financial risk modeling, financial mathematics, financial instruments and investment portfolio management.

One useful definition of ERM is that adopted by the Casualty Actuarial Society (CAS) in 2003: “ERM is the discipline by which an organization in any industry assesses, controls, exploits, finances, and monitors risks from all sources for the purpose of increasing the organization's short- and long-term value to its stakeholders."

Two new key ideas emerge from this definition: that ERM applies to **any** industry; and that the focus is on **increasing value** to its stakeholders. ERM is not only about limiting the downside risks in the financial services industry!

Furthermore, the CAS report conceptualized ERM to operate across the two dimensions of risk type and risk management processes. Risk types included Hazard, Financial, Operational and Strategic. The envisaged risk management process involves steps remarkably, or maybe not surprisingly, similar to the actuarial control cycle.

There is already a large body of actuarial literature on ERM which I will not try to summarize here. However, a very interesting recent development, and an example of synthesis in action, is the ERM guide being developed in the UK jointly by the actuarial and civil engineering professions. This ground-breaking work is being led by Chris Lewin, a UK actuary. Although not yet published, its working draft can be accessed via the UK actuarial profession website. An interesting feature of their approach is the focus on building robust enterprises able to withstand uncertainty generally as opposed to only single risk events.

The primary shift in thinking has been driven by the word "enterprise", shifting the focus significantly to risks and opportunities at the enterprise level. Financial modeling now becomes a sub-process of the ERM process.

This culmination of these developments in actuarial circles just happened to coincide with the global financial crisis of 2008 and 2009. This has given ERM more prominence and its establishment added impetus as society seeks ways to reduce the impact of future financial and economic crises.

One of the plenary speakers at the International Congress of Actuaries (ICA) held in Cape Town in March 2010 was the prominent actuary and academic, Professor Paul Embrechts. In his keynote address, he demonstrated how the use, or misuse, of mathematical models contributed in part to the financial crisis. However, he went on to say *"The overall societal relevance, importance and success of mathematics is beyond any doubt",* but he added the warning to be *"always be scientifically critical, as well as socially honest, adhere to the highest ethical principles, especially in the face of temptation …which will come!"*

What about systemic risk?

At the ICA 2010 one of the noticeable themes was the need for actuaries to involve themselves more in the management of systemic and societal risks. The keynote address was by the Minister of Finance of South Africa, Pravin Gordhan, who said: *"We have infinitely more data and data processing capacity at our disposal, and statistical analysis can increasingly be extended into territory that used to be regarded as non-financial, unquantifiable, social or philosophical . . . as a profession trained to deal with the future and its likely probabilities, you have both an unenviable task and exciting possibilities to connect the dots and evolve new conceptual frameworks to not only understand the world but change it."*

It is quite logical that as actuaries we should find ourselves interested in the systemic level, where we can apply the basic ERM thought processes. This is obviously fertile ground for further thought and development. Anybody wanting to think about systemic risk must read John Kenneth Galbraith's excellent book The Great Crash 1929. Published in 1954, it is a retrospective analysis of, not only the 1929 market crash, but why that crash had such a significant impact on the real economy, which resulted in the great depression of the 1930's. This book also provides telling insights into our current global financial crisis, probably better than anything written recently on the topic.

Galbraith gave reasons why the crash was the result of a classic boom and bust cycle, but went on to say that the resulting depression was the result of a *"fundamentally unsound economy".* His analysis of the situation was that *"five weaknesses seem to have had an especially intimate effect on the ensuing disaster; they are:*

- *The bad distribution of income . . .*

- *The bad corporate structure . . .*
- *The bad banking structure . . .*
- *The dubious state of the (US) foreign balance . . .*
- *The poor state of economic intelligence . . ."*

There have clearly been some lessons learnt since 1929, but perhaps not others?

Garth Griffin, also talking about the financial crisis in his Presidential Address in 2008, gave us a sober warning that: *"What we see had its roots in those very institutions that took the greatest pride in their risk management systems and processes, where financial models of great complexity were developed by very skilled mathematicians, and rapidly spilled over into deposit taking institutions."*

Is ERM the core actuarial skill?

One way to think about ERM is to substitute the word "entity" for enterprise. If it were "entity", then we would all agree that actuaries' core skills include risk management of entities, including life funds, pension funds, medical insurance funds, investment funds, friendly societies, etc.

For all of these entities we are used to thinking in terms of the whole entity and for the whole of its existence. The assets and the liabilities, the modeling and matching of cash inflows and outflows, the risks to the entity and the management action to address risks and issues; and of course and most importantly, the actuarial control cycle.

Many actuaries involved in the global development of ERM go so far as to say that enterprise risk management brings together all the skills and disciplines of actuarial training into one discipline.

However, the move to "enterprise" does require some new dimensions to our skill set. An enterprise is by definition larger than a single balance sheet or fund account. It is more complex, with multiple stakeholders and several possible sources of capital. An enterprise can be in any industry and take any legal form. An enterprise could even stretch to being a country, as in "South Africa Inc".

But actuaries are surely not put off by increased complexity. The fundamental process steps and the fundamental approaches to mathematical modeling remain the same. The fundamental risk and opportunity management processes reflect the well-worn path of the actuarial control cycle.

A critical skill, already required of actuaries, but now so much more prominent in ERM, is that of communication, especially the listening aspects of communication. The reason for this is that much of the insight into any enterprise resorts in the minds of the key stakeholders and it is only by listening to them carefully that the actuary can properly analyze and then synthesize the risk opportunity profile of the enterprise.

Certified Enterprise Risk Actuary (CERA)

A historic event took place in Hyderabad last year when fourteen member associations of actuaries signed the multilateral ERM Treaty. The Society was a founder member and signatory of this Treaty that established the designation of a Certified Enterprise Risk Actuary (CERA).

Since the global financial crises and its aftermath, the concept of combining strong technical skills with professional standards of conduct within risk management had been gaining ground. The CERA designation and the discipline processes that surround it in the actuarial profession directly address those needs.

CERA will be awarded through qualified participating associations. It will provide effective global recognition for actuaries who meet the necessary education requirements in Enterprise Risk Management (ERM) and are governed by a strong code of professional conduct.

The Society and some of its members, in particular Garth Griffin, have been very actively involved in the thought leadership and development of the CERA qualification globally, both in terms of the subject content as well as the governance processes. As a founding signatory to the Treaty, the Society also has a seat on the Treaty Board, as well a seat on the Board of the entity that will hold the intellectual property rights.

How is the Society embracing CERA?

The Council of the Actuarial Society of South Africa resolved that the development of ERM skills among its members and the award of a CERA designation to its members is a critically and strategically important development in pursuit of its vision and mission.

While the signing of the Treaty was a significant milestone, much remains to be done and is now being vigorously pursued. Council has decided to implement a plan to achieve Award Signatory status with the CERA Treaty as soon as possible. The first significant step has been the decision to incorporate a new ERM subject into the South African curriculum and with immediate effect make available the current UK ERM subject to our members as the basis for obtaining a CERA designation.

In addition to passing the specific ERM subject, members will also be required to have attained Associate (or Fellowship) status within the Society to be considered the CERA designation. We expect that in due course there will be members with the CERA designation who obtain their designation as:

- An existing or new Associate member of the Society with the addition of the ERM subject;
- An existing Fellow member of the Society with the addition of the ERM subject; and
- A new Fellow member of the Society who incorporated the ERM subject as one of their subjects en route to Fellowship.

Can we deliver on ERM opportunity?

In addition to the actions being taken by the Society in respect of the CERA qualification, our members must look for opportunities themselves; both to enhance their own personal qualifications and expertise, but also to seek out and grapple with opportunities in the field of ERM. The development of CERA also provides actuaries with an opportunity to apply their training in an area where the profession really can and should take the lead, both in thought leadership and in practice.

Several major areas of financial services and other legislation that are currently under review, place a premium on effective risk management. The new Companies Act will require every Board of Directors in South Africa to have a significant and formal focus on proper enterprise risk management and sustainability.

The real delivery, however, will be measured in time and by historians. The delivery will hopefully be evaluated on the extent to which the profession had in fact provided thought leadership on ERM that lead to greater social and economic stability and prosperity.

The ramble home

In conclusion, I have suggested that risk management and, in particular enterprise risk and opportunity management is a core actuarial skill. The profession, both globally and in South Africa have embraced this opportunity and it is now up to individual members of the actuarial profession to do the same.

It is fitting for me to end this ramble on risk with a quote from Redington who can explain far better than I could, how the actuary should approach the field of enterprise risk management:

“. . . the actuary’s danger may lie in too close preoccupation with his particular techniques. His real strength lies elsewhere; in a broad training whose firm roots are in mathematics and statistics, but whose branches reach out into commerce, investments, administration and all the bustle of humanity . . . the actuary cannot foretell the future . . . what he can do and does is to sense the wide-ranging possibilities that the future may have in store and to make them a living part of the present where decisions are made.”

END

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