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The Upside of Risk Management

By Shaun Wang*

Running a business is like sailing in uncharted waters of risks and uncertainty, navigating the ship through the waves and tides. Corporate executives, like captains of ships, are entrusted with the responsibility of recognising the current tides and waves, anticipating the new tides coming, and steering the ship in the midst of complex dynamics of multiple currents.

When it comes to insurance companies, managing risk is not just about navigating one's own ship in wild waters, but also providing essential skills for helping (internal and external) clients reach their business goals, which is an upside of risk management.

In this issue of the Risk Management newsletter, we focus on the upside of risk management and invite contributions on a variety of topics from a broad range of experts.

The editor reviewed some of the major tide waves in the world of insurance. Broadly speaking, some of the mega trends include technological developments, shifting demographics and economic power. Specifically, the post-2008 global financial crisis has created a challenging financial and regulatory environment for insurers. It provides a context for discussing some specific areas of the upside of risk management. It also identifies "increasing complexity" as a main hurdle for insurers to reach the upsides.

Rolf Tanner contributed the piece "Making Risk Management Adaptive to a Faster, Taller, Bigger World: the Critical Power of Early Warning", drawing on the work of Swiss Re as well as the CRO Forum.

Garin Pace, Anthony Shapella and Greg Vernaci contributed a piece on "Achieving Cyber Resilience" including a detailed discussion of what insurers have to offer their clients in managing cyber risks.

Miroslav Petkov contributed an article how Standard and Poor's take into account the upside of an insurer.

* Deputy Secretary General and Head of Research, The Geneva Association.

Complexity is identified as a major hurdle for insurers to achieve the upside. Tony Silverman contributed an article entitled "Complexity and Solvency II". Martin Eling discusses "The Complexity Risk of Regulation: an Article on the Complexity of Solvency II".

The issue also includes interviews with two CROs. Marco Vet of Achmea and Douglas Caldwell of NN Group, regarding their views on the upside of risk management.

An upside of Risk Management is that CROs are receiving increasing recognition; here we present an Ernst & Young survey by Bill Spinard and Chad Runchey.

Major Tide Waves

By Shaun Wang⁺

Digital technology developments

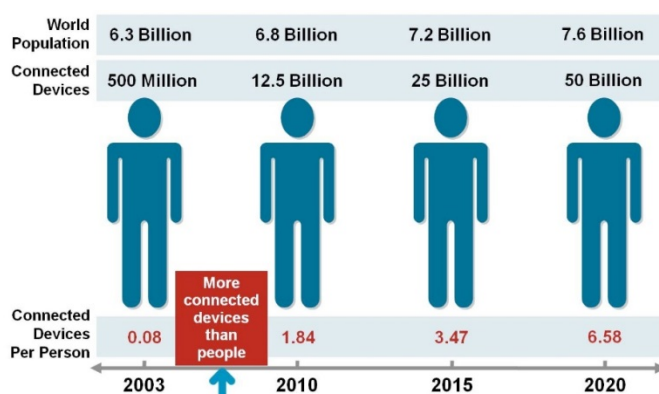
One major tide wave is the breakneck pace of development in digital technology and mobile communications, which are powering big changes in every aspect of business operations.

Most people can recognise how the Internet revolution has changed every aspect of daily life, in communication, business, education, government, and society. The next big revolution, already taking place, is the Internet of Things (IoT), which represents a huge leap to the next level in its ability to gather, analyse, and distribute large amounts of data that we can turn into information, knowledge and, ultimately, wisdom.

According to the Cisco Internet Business Solutions Group (IBSG),¹ the IoT is defined as the point in time when more "things or objects" were connected to the Internet than people. According to this definition, Cisco estimates the IoT was "born" sometime between 2008 and 2009 (see Figure 1).

In 2003, there were approximately 6.3 billion people living on the planet and 500 million devices connected to the Internet. Explosive growth of smartphones and tablet PCs brought the number of devices connected to the Internet to 12.5 billion in 2010, while the world's human population increased to 6.8 billion. Cisco estimates there will be 25 billion devices connected to the Internet by 2015 and 50 billion by 2020.

Figure 1. The Internet of things was "born" between 2008 and 2009



Source: Cisco IBSG, April 2011

One of the defining features of the IoT is *sensors* that are installed in or connected to networks of computing systems and mobile devices that can transmit and receive data in a real-time, interactive manner. As articulated by Peter Hartwell, Senior Researcher, HP Labs, "With a trillion sensors embedded in the environment—all connected

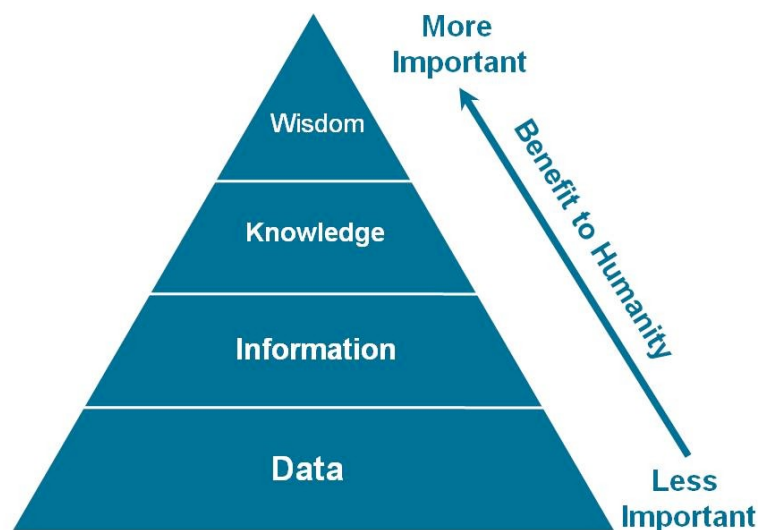
⁺ Deputy Secretary General and Head of Research, The Geneva Association.

¹ Evans, D. (2011) *The Internet of Things: How the Next Evolution of the Internet Is Changing Everything*, San Jose, CA: CISCO

by computing systems, software, and services—it will be possible to hear the heartbeat of the Earth, impacting human interaction with the globe as profoundly as the Internet has revolutionised communication.”

According to the CISCO white paper, the IoT will profoundly change how we communicate. Humans evolve because they communicate. This principle of sharing information and building on discoveries can best be understood by examining how humans process data (see Figure 2). From bottom to top, the pyramid layers include data, information, knowledge, and wisdom. Data is the raw material that is processed into information. Individual data by itself is not very useful, but volumes of it can identify trends and patterns. This and other sources of information come together to form knowledge. In the simplest sense, knowledge is information of which someone is aware. Wisdom is then born from knowledge plus experience. While knowledge changes over time, wisdom is timeless, and it all begins with the acquisition of data. The IoT dramatically increases the amount of data available for us to process. This, coupled with the Internet’s ability to communicate this data, will enable people to advance even further.

Figure 2. *Humans turn data into wisdom*



Source: Cisco IBSG, April 2011

As the CISCO white paper put it, the IoT represents the next evolution of the Internet. To the extent that we can turn large amounts of data into information, knowledge and wisdom, the IoT has the potential to change the world as we know it today—for the better.

According to Goldman Sachs,² with the rapid development of the IoT, the global industrial sector is poised to undergo a fundamental structural change akin to the industrial revolution. Equipment is becoming more digitised and more connected, establishing networks between machines, humans and the Internet, and leading to the creation of new ecosystems that enable higher productivity, better energy efficiency and higher profitability. Goldman Sachs estimates the IoT opportunity for industrials could amount to USD 2tn by 2020. The IoT has the potential to impact everything from new product opportunities, to shop floor optimisation, to factory worker efficiency gains that will power top-line and bottom-line gains.

Goldman Sachs’ report also highlights that the IoT creates huge demand for big data technologies and analytics that enable enterprises to glean insights from significantly larger data sets collected by connected devices. Increased investment in analytical platforms and visualisation technologies will allow enterprises to make sense of the information and react to it.

² <http://www.goldmansachs.com/our-thinking/outlook/internet-of-things/>

Opportunities for insurers: big data

Some insurers are embracing predictive modelling capacities in their underwriting and risk selections. The opportunities are much wider and deeper:

- 1) Can insurers use big data to offer parametric or index-based coverages on flood risk?
- 2) Can insurers offer liability insurance products that pay compensation for suffering/loss computed using big data?
- 3) Can insurers work with regulators to develop metrics that are more indicative of emerging risks?

Opportunities for insurers: cyber risk insurance

The IoT can represent the “buildings” in the digital world, the integrity of data (cyberattack, data breaches or temperament can represent huge business losses). The advent of the digital economy presents new challenges and opportunities. The risk of cybercrime, data breach and IT failures has been on a rapid rise. According to Allianz’s risk barometer, in Germany, the U.K. and the U.S., cyber risks are among the top three corporate risks. Globally, cybercrime was ranked as the eighth business risk in 2014 and 15th in 2013. Along with the fast-paced evolution of new technology, cybercrime is also evolving, with the amount of malware and malicious software for Android devices rocketing by 400 per cent since 2012.

Some insurers are already proactively developing insurance products to help their customers in data protection. These insurers work closely with IT security architects and clients, and combined their knowledge to identify and evaluate threat scenarios, in a multi-stake holder collaboration.

Medical and biology technology

While the Internet of Things is revolutionising the digital world, we are at the brink of as important or even more exciting breakthroughs in medical and biological technology that will change society and the business and financial worlds. Just to mention one specific bio-technology, in a significant breakthrough, scientists announced a commercially viable nanogenerator—a flexible chip that uses body movements such as the pinch of a finger to generate electricity. According to Professor Zhong Lin Wang of the Georgia Institute of Technology, “This development [the nanogenerator] represents a milestone towards producing portable electronics that can be powered by body movements without the use of batteries or electrical outlets. Our nanogenerators are poised to change lives in the future. Their potential is only limited by one’s imagination.”

Such medical and biological breakthroughs are expected to increase productivity and the total wealth of nations. Of course, individuals and corporations will be impacted differently depending on how they embrace the coming changes. How can insurers participate in the wealth creation brought by medical and biological breakthroughs? How can insurers enable their customers in participating in this wealth creation process?

Shifting demographics and economic powers

The global population is seeing unprecedented shifts in the demographic composition. Globally, there are currently about 350 million people over age 70; in 10 years, this figure will go to 1 billion. Some countries (about 45 of them) are experiencing population declines, while other countries are experiencing population growth.

According to the United Nations Report *World Urbanization Prospects*,³ the coming decades will bring further profound changes to the size and spatial distribution of the global population. The composition of population in some European countries (such as France and Germany) is shifting, and tensions are being created by these shifting demographics. The U.S. Census Bureau projects that whites will become a minority in the U.S. by 2043.

³ United Nations, Department of Economic and Social Affairs, Population Division (2014) *World Urbanization Prospects: The 2014 Revision, Highlights* (ST/ESA/SER.A/352), <http://esa.un.org/unpd/wup/Highlights/WUP2014-Highlights.pdf>

The continuing urbanisation and overall growth of the world's population is projected to add 2.5 billion people to the urban population by 2050, with nearly 90 per cent of the increase concentrated in Asia and Africa. At the same time, the proportion of the world's population living in urban areas is expected to increase, reaching 66 per cent by 2050. As the world continues to urbanise, sustainable development challenges and opportunities will have major economic implications for both the public and private sectors.

In parallel to the shift in demographics, there is a shift in economic power. Based on demographic trends, the U.S. can even command a stronger leadership among advanced economies. The U.S. will continue to grow and remain to be the most dominant economic powerhouse, in part due to its ability to adapt and innovate, and to attract and retain talents. However, thanks to the flattening of access to technology and communication, the emerging economic powers are expected to grow faster. In the next 30 years, the GDP of emerging markets of the E7 countries (China, India, Brazil, Russia, Indonesia, Mexico and Turkey) will be double that of the shrinking G7 countries (U.S., Japan, Germany, U.K., France, Italy and Canada).

There is a growing middle class which is more digital and financially savvy, and these people have needs in funding their own retirement and their children's education in their own home country or abroad. How can insurance respond to these megatrends?

Aftershock of the 2008 financial crisis

As we now enter the year 2015, the impact of the 2008 financial crisis is still being felt. Indeed, post the 2008 financial crisis, central banks in advanced economies came to the rescue by providing accommodative monetary policies and ultra-low (even negative) interest rates for an extended time period. A prolonged period of low interest rates has prompted some investors to seek higher returns in riskier ventures. Those investments might collapse any time and threaten the stability of the financial system if the economic climate turns bad due to geopolitical conflicts, or the unwinding of quantitative easing.

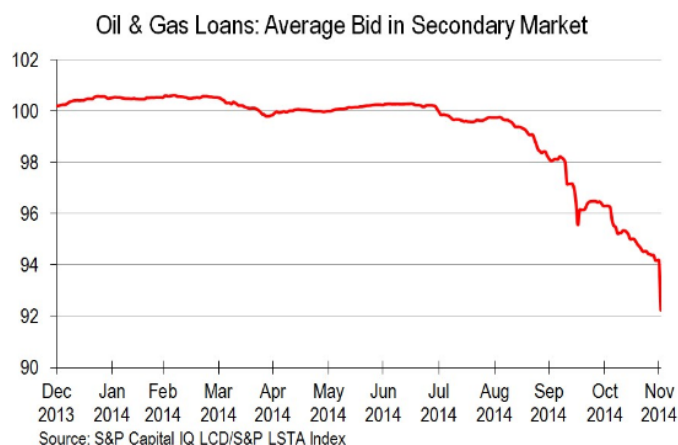
The rising stock market valuations in recent years are a sign that money went into financial speculations rather than economic investment. It is unlikely the underlying corporations could earn anywhere near enough money to justify prices in any reasonable time frame. Stockholders, however, expect management to sustain or increase prices. This puts pressure on managers to manage for the short term, damaging the long-term prospects of the corporation.

Recent geopolitical tensions in the Russia-Ukraine crisis, and the unexpectedly fast and furious plunge of oil prices have elevated the risk of disruptions to the financial system. For instance, many shale gas ventures in the U.S. are financed through high-yield bonds and loans. According to the writer Adam Galas⁴, "since 2010, U.S. energy companies have borrowed \$550 billion to invest in America's booming shale oil and gas industry. A good deal of this borrowing was through high-yielding junk bonds, which now comprise \$210 billion, or 16% of America's \$1.3 trillion junk bond market". Figure 3 shows the loss in value of oil and gas loans. Adam Galas points to another major risk factor in Russia's corporate debt, which totals USD 660bn, and USD 160bn of which is denominated in foreign currency and held by foreign companies, mostly in Western Europe. Of this debt, between USD 90bn and USD 117bn will need to be repaid in 2015. With Western sanctions shutting off access to foreign credit markets, and Russia's economy likely headed for a steep recession in 2015, the spectre of a wave of corporate defaults triggering a financial crisis in an already fragile European debt market has some analysts concerned.

A prolonged period of low oil prices would create major defaults of these bonds and loans. The world is more interconnected today. Any shocks from advanced economies have the potential to more quickly propagate in emerging markets.

⁴ <http://www.fool.com/investing/general/2015/01/17/should-oil-prices-have-you-worried-about-the-next.aspx>

Figure 3. Evolution in value of oil and gas loans



One can argue that, the quantitative easing (QE) monetary policies of major central banks and the lofty high valuations of financial assets create similar conditions that led to the 2008 financial crisis. A big difference is that today, central banks have already exhausted their conventional and non-conventional monetary policy tools since the 2008 financial crisis: how much lower can interest rates go from current levels? How much capacity do central banks have in purchasing additional assets without jeopardising the confidence of investors?

Many economists appreciate what the central bankers of advanced economies are doing to rescue the economy from falling into recession. On the other hand, the very actions of the central bankers are creating new risks. Only two weeks into 2015, the Swiss National Bank has shocked the world by abolishing the pegging of the Swiss franc to the euro and created major havoc on FX markets. The QE of the European Central Bank is creating new dynamics for monetary systems in the world.

Accumulated structural issues of the global financial system

Jose Vinals, the IMF's top financial counsellor, has highlighted a structural problem: *the world economy needs more productive investment and less in speculative assets*, which, in many cases, are now overvalued and pose big stability risks. Not enough of the easy money pumped into economies by advanced countries' central banks is going into economic activities that support growth. Instead, too much is going into financial risk-taking that poses challenges to global financial stability. The world economy is at risk from the build-up of certain excesses in financial risk taking. Many assets are richly valued and way out of line from fundamentals.

Flooding easy money into the financial system has not resolved the accumulated structural issues. Looking at the recent election in Greece as an example, structural issues such as high unemployment and heavy indebtedness are plaguing the Greek economy and creating a political backlash and mistrust on the part of the prevailing international financial order.

While the financial system is flooded with easy money, in the real economy, there is a "drought" and "thirst" for financing. According to the OECD, Swiss Re and other sources, the projected need for infrastructure over the next several decades is enormous. The global annual infrastructure spending requirements are estimated to increase from USD 2.6tn to around USD 4tn by 2030. In OECD countries, private core infrastructure amounted to 1.7 per cent of GDP (privately owned roads, railways, communication networks, electricity, gas and water supply works). The need for infrastructure investment is not only in emerging economies, but also in advanced economies. For instance, in the U.S., the Netherlands and Germany, the private core infrastructure investment share is less than 0.7 per cent of annual GDP, compared to an OECD average of 1.7 per cent.

The effects of ultra-low interest rates

For insurers, prolonged low interest rates in effect create a situation of financial repression: indeed, the super-low interest rates take money from savers and give it to financial speculators. As a consequence of ultra-low interest rates, investors are actively searching for yield in alternative investment channels.

In the ultra-low interest rate environment, the hunger and thirst for yield have attracted much alternative capital to the (re)insurance market for property catastrophe risks. The global non-life insurance sector has witnessed in recent years a tide wave of alternative capital coming to the insurance industry from pension funds and hedge funds, putting more pressure on the pricing level for catastrophe insurance. Increased market pressure has given impetus to the recent tide wave of mergers and acquisitions of general (re)insurance companies. Among the latest news are the XL Group's acquisition of Catlin and the announced merger of AXIS Capital and Partner Re.

Due to a flush of insurance capital, there is no shortage of supply for insurance. On the other hand, the demand for insurance protection has not increased accordingly, despite the fact that there are increasing uninsured exposure, creating a mismatch of supply and demand for insurance capital.

The low interest rate environment also poses challenges to the traditional life insurance business model which channels saving into long-term investment (consisting predominantly of low-yield sovereign debts).

Climate risks

The World Economic Forum (WEF) has just released a report⁵ on the biggest risks in 2015. Extreme weather events, such as floods and storms, ranked as the second biggest threat to the world over the next 10 years. Extreme weather events can potentially cause major damage to property and infrastructure, as well as cause human losses. Heat waves, extreme rainfall and drought-related shortages of water and food will increasingly test the resilience of infrastructure in these and other cities. In particular, 15 of the world's 20 megacities—those with over 10 million inhabitants—are located in coastal zones threatened by sea level rises and storm surges.

According to the recent report *New Climate Economy*, the next 15 years will be critical, as the global economy undergoes a deep structural transformation. Around USD 90tn is likely to be invested in infrastructure in the world's urban, land-use and energy systems. How these changes are managed will shape future patterns of growth, productivity and living standards.

The ongoing climate changes call for more investment in resilience, which requires well-rounded knowledge of risk exposure assessment, project finance, and cost-benefit analysis of projects (infrastructure, buildings and products) in light of the impact of various hazards to the communities.

Adaptation and resilience: Insurers have much to contribute to help communities to develop adaptation and resilience measures. Firstly, insurance coverage provides financing to restart an economy after a disaster. Secondly, insurers can offer risk engineering services to municipalities and corporate customers to prevent losses, and integrate risk engineering services with insurance coverage.

It can be argued that, over the medium to long term, one effective way of putting money into more productive use, is to invest in adaptation and disaster prevention measures, as well as provide pre-event insurance protection of public infrastructures, so as to increase the overall efficient allocation of capital and boost economic productivity.

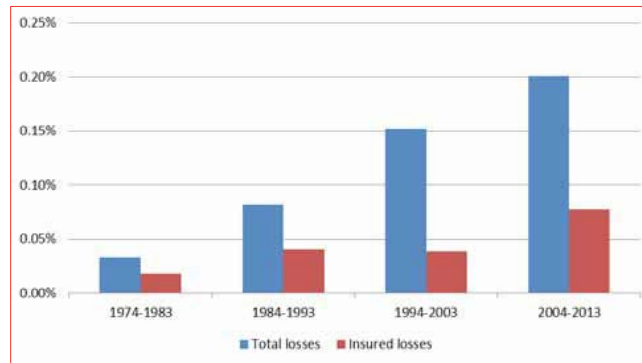
Underinsurance: challenges and opportunities for insurers

The Geneva Association recently published a report, *The Global Insurance Protection Gap—Assessment and Recommendations*. The research report shows that general (non-life) Insurers are facing a widening protection gap. Figure 4 compares global total losses resulting from natural catastrophes with associated insured losses, as a percentage of global GDP, over the period 1974 to 2013. The protection gap, i.e. the difference between insured and total losses as a share of GDP, has widened consistently over the period.

Figure 5 shows that most underinsured markets are emerging economies, similar to the findings of the Lloyd's study. Insurance gaps in many emerging countries are exacerbated by the rapid pace of urbanisation. The Indonesian capital Jakarta is a case in point. A 1-in-a-100 year earthquake loss would leave a USD 10bn protection gap. This shortage is estimated to rise to about USD 30bn by 2023 on the back of rapidly increasing asset values.

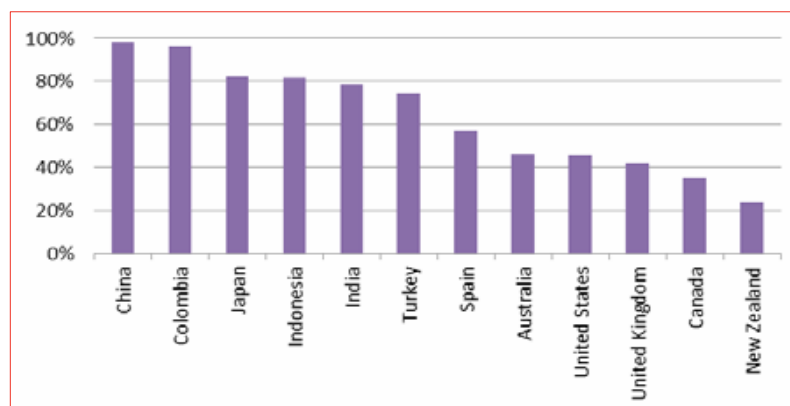
⁵ World Economic Forum (2015) *The Global Risks Report 2015*, <http://www.weforum.org/reports/global-risks-report-2015>.

Figure 4. Total global losses vs insured losses resulting from weather-related catastrophes (1974–2013, 10-year average, in per cent of GDP)



Source: Swiss Re Economic Research & Consulting

Figure 5. Natural catastrophe protection gap in per cent of economic losses (1974–2013)



Source: Swiss Re Economic Research & Consulting

Insurers face increased complexity due to regulation and financial reporting

With the previously mentioned challenges and opportunities for insurers, it is imperative for insurers to be more proactive and innovative in their business model and product offerings, and to fulfil their role in serving the broader economy. A key question is: What are the major hurdles for insurers to reach that goal?

At the ground level of the day-to-day operating environment for insurers, very quickly we will see that overly burdensome complexity in regulation and financial reporting requirements are putting a strain on the (financial and human) resources of insurers. The intent for harmonised global regulation is all good and noble, especially in light of the recent 2008 financial crisis. However, the original intent can easily get lost in the process of implementation, and in ever-increasing complexities. These ever-increasing complexities are the main hurdles for insurers to fulfilling their full potential in contributing to economic stability and development.

Here, what is really needed is greater wisdom on the part of policymakers, regulators and supervisors at the highest level. The insurance industry must contribute to that required wisdom, for the sake of the well-being of consumers and the long-term health of the financial system.

Insurers have a business model that focuses on the long-term. The international community would be better served if insurers are enabled to serve as stabilisers and not be subject to the swing of day-to-day financial market volatilities.

Making Risk Management Adaptive to a Faster, Taller, Bigger World: the Critical Power of Early Warning

By Rolf Tanner⁺

Faster, taller, bigger: the world is moving at a quick pace, in all directions. Of today's 30 tallest buildings, only 10 were built before 2000. Five had been added by 2009. This makes 15 having been built between 2010 and today....And while the tallest skyscrapers nowadays soar 800 meters into the skies, plans are under way to go even higher with more than 1,000 meters—the Kingdom Tower in Saudi Arabia, to be completed by 2019. These are just examples of the constant cycle of record-setting and –busting we are experiencing, in all walks of life. Much of this correlates with the two engines of growth, the economic expansion of the emerging markets on the one hand, and the rapid progress we see in the fields of science and technology on the other hand: biology and genetics, IT, robotics and sensors, nanotechnology, artificial intelligence, among others. Growth seems no longer linear, but exponential.

What does this mean for risk management? When the world is moving faster, we have less time to react to avoid accidents. And as the world is travelling further into spaces it has not been before, we must think about possible events and their effects which have not occurred yet—and may never occur. And so, in order to paraphrase Herman Kahn and his famous tagline of "thinking the unthinkable" (in his case, of global thermonuclear war), we need to "think the never thought before" when we are considering a new risk landscape deriving from the "faster, taller, bigger" spiral. Obviously, to measure tomorrow's exposures, we can no longer simply extrapolate into the future from what we saw in the past.

The Chief Risk Officer Forum (CRO Forum), which assembles the Chief Risk Officers of 25 insurance and reinsurance companies (mostly from Europe), has now come up with its newest publication addressing exactly these issues.⁶ It gives a high-level overview and seeks an industry consensus on what the issues are at stake and what needs to be done.

Swiss Re entered the field of early risk detection in the late 1990s. It has built up a system to collect and process notions associated with risk (SONAR).⁷ Input is provided both by internal and external sources: Swiss Re underwriters, risk and claims managers in the first case; a plethora of experts in the second case (scientists and university researchers, industry bodies, futurists, but also public organisations like the World Economic Forum (WEF) and its annual *Global Risk Report*⁸). The findings are widely shared internally and externally. Since 2013, Swiss Re has published its annual SONAR Scan bulletin.⁹ The bulletin deals with new risk themes, grouped according to their perceived potential impact on the (re)insurance industry. Obviously, dealing with emerging risks whose contours are by definition vague and opaque at the moment of detection is not—cannot be!—an exact science. Essentially, it is about the non-quantifiable or, more precisely, about the pre-quantifiable. Yet, while the benefits of new developments are often visible upfront, there normally is a time lag for the arrival of the first, unintended negative effects. The findings of the SONAR Scan help Swiss Re to shape its business policy and strategy. More importantly, they are also the subject of discussions with clients—the primary insurers who often are much closer to initial exposures emanating from emerging risks. Understanding risks early is the first step in finding a solution for managing and mitigating them collaboratively with clients.

The consequences of the "faster, taller, bigger" trend as addressed in the CRO Forum report are also reflected in the findings of the SONAR Scan. Take, for example, air pollution as a mortality driver. Much of the growth in emerging markets is driven by the dual processes of industrialisation and urbanisation—processes that Europe and North

⁺ Senior Risk Manager with Swiss Re's Emerging Risk Management team.

⁶ <http://www.thecroforum.org/15722/>

⁷ http://www.swissre.com/rethinking/emerging_risks/swiss_re_ahead_of_the_curve_in_charting_emerging_risk.html

⁸ http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2014.pdf

⁹ http://www.swissre.com/rethinking/emerging_risks/Swiss_Res_SONAR_new_emerging_risk_insights_for_2014.html

America already underwent in the 19th and the first half of the 20th century. The number of megacities—metropolitan areas with 10 million or more inhabitants—is set to rise from 20 in 2011 to 37 in 2025, of which 30 will be located in emerging markets.¹⁰ Industrialisation and mass motorisation turn air pollution into a major health hazard in these sprawling megalopolises and, in some Chinese cities, it has now the same impact on mortality as smoking, reducing average life expectancy by three to five years.

This highlights an important feature: air pollution is, of course, not a new risk as such. Just think of the “smog” in U.K. or U.S. cities in the 1950s and 1960s. Often, emerging risks are not new as such, but they (re)appear in new and different contexts. With man-made risks, norms and laws can change and thus shift the burden from one party to another.

Research shows that human failure—the famous human factor!—is the key driver for many losses. In an ever more complex world, this looms large and poses a major challenge to the future of risk and safety management. As margins of error diminish in an interconnected, super-efficient environment, loss prevention is critical. This requires investments which, in tight cost-management regimes, tend to be disputed as “unnecessary” and “not producing a return”, and therefore, are often not happening at all or only at insufficient levels. But when investments are made, and at sufficient levels, they must meet a dual goal: on the one hand, they must prevent losses; on the other hand, they must enhance resilience. These goals may appear contradictory, but as total loss prevention can never be assured, risk management must strive to meet both goals. Consequently, the key is collaboratively to design and develop flexible systems that are as safe as the ones we have today. A safe system needs a certain set of factors: the right protocols, the right data, the right working conditions, appropriate risk assessments, a solid lessons-learned process, and—perhaps most importantly—rich human communication, face-to-face and preferably integrating local cultural particularities (making sure people of different cultures talk about the same topics when they talk to each other; simply sharing the same meeting agenda may not suffice!).

The (re)insurance industry is instrumental in this process, both as an adviser in loss prevention and a source of indemnification should disaster still strike. Over the last years, it has contributed to critical documents that should help to cope with the complexities and intricacies of “faster, taller, bigger”. Examples include the “[Tunnelling Code of Practice](#)”¹¹ or the European Wind Turbine Committee’s “[Offshore Code of Practice](#).”¹² Joint development of critical guidelines can be successful in managing a rapidly moving risk landscape imbued by the mind-boggling progress in technology, the economy and society at large.

Achieving Cyber Resilience

By Garin Pace, Anthony Shapella and Greg Vernaci⁺

Cybersecurity has become the single most important risk to company boards of directors around the world. This is not a surprise: the global economy has become highly networked and depends on continuous, secure and uninterrupted data flow. The highly networked environment presents tremendous opportunities for enterprising firms, but this opportunity brings its risks. For example, recent high-profile attacks have targeted point-of-sale terminals at Target, Home Depot and Staples, server software at J.P. Morgan and employee databases at Sony. In the face of such complex risks, what can a company do to protect itself?

The first, and most important step, is to carry out standard systems hygiene proactively. The [Center for Internet Security](#)¹³ suggests that five simple steps can prevent up to 80 per cent of cyberattacks. The steps include:

¹⁰ http://media.swissre.com/documents/sigma5_2013_en.pdf

¹¹ http://www.imia.com/wp-content/uploads/2013/08/ITIG-TCOP-01_05_2012.pdf

¹² http://vds.de/fileadmin/vds_publikationen/vds_3549en_web.pdf

⁺ Garin Pace is Head of Underwriting Excellence, Cyber for the US & Canada at AIG; Anthony Shapella is Director of Risk Aggregation, AIG; Greg Vernaci is Head of Cyber for US & Canada, AIG.

¹³ <http://www.cisecurity.org/>

- maintaining an inventory of authorised and unauthorised devices;
- maintaining an inventory of authorised and unauthorised software;
- developing and managing secure configurations for all devices;
- conducting continuous (automated) vulnerability assessment and remediation;
- actively managing and controlling the use of administrative privileges.¹⁴

Recognising this, the National Institute of Standards and Technology (NIST), working under an executive order of the President of the United States, developed a common cybersecurity framework that provides a roadmap for companies to implement standard security practices.¹⁵ The U.K. has also implemented a similar framework that it calls Cyber Essentials.¹⁶ Clearly, standard practices will help companies improve their defences and prevent the bulk of cybersecurity events.

Cyber resilience planning

While standard hygiene is a start, it simply cannot prevent all attacks. As such, leading firms are moving beyond prevention and focusing on resilience.¹⁷

This can be achieved by developing a “cyber resilience” action plan for responding when an attack occurs. A plan is best developed by a cross-functional working group of senior managers (sales/marketing, operations, IT, finance, legal, risk, HR) that meets regularly to discuss cybersecurity, monitor evolving internal and external threats, and model and analyse hypothetical attacks. A good resilience plan will detail roles and responsibilities, external parties that will assist with remediation, communication and crisis management plans and operating strategies for various types of events. Having an action plan in place *prior to an event* has been shown to dramatically reduce the cost, time to recovery and reputational damage of a breach.

It is important to appoint a strong leader to chair the working group. The chairperson is often the firm’s chief information security (CISO), chief information (CIO) or chief technology officer (CTO). He or she regularly reports the group’s work to the board of directors (or a designated subcommittee) to ensure that all parties understand the cybersecurity risk profile, potential threats and planned strategy for breach response. The group may also serve as the decision-making body to weigh investments in systems security and other risk mitigation strategies. Last, and most importantly, the group should foster an on-going and active dialogue between the firm’s senior executives so that all parties are prepared to respond and are on the same page when an event occurs.

Crafting the plan

Once the group is established, the chairperson can begin work on the plan. First, it is important to map out the firm’s cyber risk profile. While this sounds daunting, our experience suggests that it is far more manageable once the group gets started. A recent Verizon study notes that roughly 95 per cent of all cyberattacks can be explained by nine basic patterns.¹⁸ Studying these patterns is a good way to identify the types of attacks that cause loss and tailor one’s activities to those modes that are most relevant. Some groups find that having an external cybersecurity expert facilitate the first meeting is helpful.

After attack modes are well understood, the group can work on mapping the risk landscape using a scenario-based approach. Scenarios are very effective because they challenge the leadership team to think deeply about and discuss possible attack modes, targets, vulnerabilities and impacts. A visual map can be used to line up the various

¹⁴ <http://www.nationaldefensemagazine.org/archive/2014/May/Pages/NewCyberHygieneCampaignSeekstoCurtailAttacks.aspx>

¹⁵ The framework can be accessed here: <http://www.nist.gov/cyberframework/upload/cybersecurity-framework-021214.pdf>

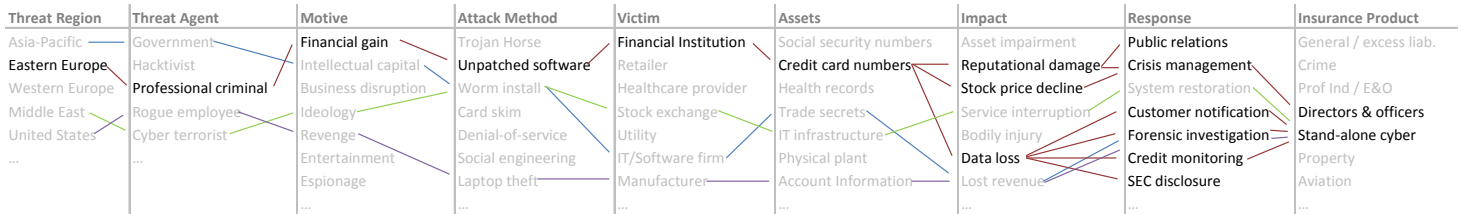
¹⁶ The scheme can be accessed here:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/317481/Cyber_Essentials_Requirements.pdf

¹⁷ For a more in-depth read on cyber risk resilience refer to the CRO Forum’s recently published paper *Cyber Resilience—The Cyber Risk Challenge and the Role of Insurance*

¹⁸ <http://www.verizonenterprise.com/DBIR/2014/>

“nodes” in the attack chain. The following diagram can be used as a prototype to get the group started and generate a number of scenarios.



We’ve found that an easy way to “seed” the scenario library is to consider narratives of actual events and swap in the company’s name and details. Then, one can iterate on that scenario by changing various nodes, i.e. threat regions, threat agents, motives, attack methods, assets, impacts, etc. The key to this step is to identify a robust set of possible events and discuss the likelihood and impact of each. Narratives with higher likelihood and/or impact can be prioritised first, and risk mitigation strategies can be discussed across the group. The cross-functional discussion is critically important: strategies should consider all parties and their action steps from front-line sales people, to the customer service department, to operations and systems to finance, accounting and human resources.

Risk assessment/measurement

The next step in the process is risk assessment and measurement. This is often the step that is most daunting for the executive team. How can the group accurately assess the potential impact of a major event or data breach? The key here is to avoid *analysis paralysis*—getting rough figures down on paper and discussing them is more important than highly precise estimates. Further, rough estimates can be compared against external benchmarks of actual events. For example, if the Target breach happened at our firm—would the cost be higher or lower? By how much?

Fortunately, a growing data set is emerging that can help companies estimate the cost of a major cyber event. Some firms have analysts in the IT or finance department collect information on events that have occurred and build a database out of this information. For example, by searching Securities and Exchange filings,¹⁹ one can find the following information about the Target breach:

- **Attack duration:** 20 days (11/27–12/17)
- **Attack method:** malware installation on point-of-sale transaction system
- **Attack location:** U.S.-based stores
- **Assets compromised:**
 - 40m credit and debit card account profiles
 - 70m guest information profiles (names, mailing/email addresses, etc.)
- **Estimated cost:** ~USD 250m gross and ~USD 160m net.

These data points can serve as a yardstick for estimating the total cost of an event. Some analysts also consider a cost-per-record-breached metric. For example, in rough terms, USD 250m of costs divided by approximately 40m credit and debit card records suggests a per-record cost of USD 6.25. This metric allows one to compare costs across events and devise scenarios of varying levels of severity. Again the most important objective is to develop *rough estimates* rather than achieve perfect precision.

¹⁹ <http://www.sec.gov/Archives/edgar/data/27419/000002741914000036/tgt-20141101x10xq.htm>

Risk mitigation

Risk mitigation can take many forms. The most effective is to invest in defences for the attack modes and assets that are most at risk. For example, if a company determines that its greatest threat is malware installations, to point-of-sale software systems, directed by domestic operatives, via vendor access rights, then it might consider investments in end-to-end encryption, Application White Listing (AWL), File Integrity Monitoring (FIM), system access software, vendor access controls and regular reviews of all vendor access logs.

While investing in prevention is paramount, not all attacks can be fully mitigated. For these events, cyber insurance is critically important. Cyber insurance provides contingent capital and expert assistance in the event of a cyberattack or data breach. The insurance industry has tailored a suite of products that help companies quickly restore their operations and pay financial obligations. Some cyber policies also include risk management and loss prevention services that can aid companies in assessing and mitigating their exposure to events *before they occur*.

A cyber policy can respond to both the liability and the first-party direct costs associated with a cyber event. Some examples of first-party costs include forensic expenses, notification costs, credit or identity monitoring and loss of income from a network interruption. From a liability perspective, a cyber policy may also respond to regulatory and administrative actions, including fines and penalties arising out of the event. The cyber policy can be customised and coverage offerings can be added or removed based on the company's risk profile.

Increasingly, companies are reviewing other insurance purchases to ensure that they understand where there may be coverage or a potential gap. Some companies may purchase more Directors and Officers liability insurance to protect against shareholder claims of negligence following a breach. Additionally, some infrastructure and utility companies are reviewing their property, casualty and business interruption coverage to ensure that sufficient protection exists in the event of a cyber-driven infrastructure attack. While recent attacks have focused more on consumer points-of-sale, current geopolitical factors and a recent cyberattack on a German iron plant²⁰ suggest that this type of exposure cannot be ignored.

In reviewing one's coverage, it is important to note that not all policy types will respond to loss. For example, Insurance Services Office, Inc. (ISO) in the U.S. recently specified that its standard general liability policy excludes data and privacy losses from a cyberattack. As such, companies should consider a stand-alone cyber policy or supplemental coverage. Some insurance companies are offering new products that will "drop down" and provide coverage if cyber risks are specifically excluded from underlying general liability and property policies, as well as excess coverage to protect the company against larger losses, e.g. AIG's "CyberEdge PC".

Tying it all together

In sum, digital assets and information networks are critical to business success. Protecting these assets is top-of-mind for boards of directors and senior executives at companies across the world. The first step towards improving the cyber risk framework is to ensure that standard cyber hygiene is properly addressed. This will mitigate many cyberattacks, but simply cannot prevent all of them. As such, companies should focus on cyber resilience and a plan for action is essential to have in place *before a breach occurs*. Developing this plan can be achieved by assembling a cross-functional working group of senior managers and working to define the firm's cyber risk profile, design potential scenarios, measure the impact and size up mitigation strategies. Most importantly, companies should focus on getting started—a rough plan with crude measurements is perfectly OK. *The journey to cyber resilience has to start with a single step.*

²⁰ <http://blogs.wsj.com/cio/2014/12/18/cyberattack-on-german-iron-plant-causes-widespread-damage-report/>

Why Does the Upside of Risk Management Matter for Insurers' S&P Ratings?

By Miroslav Petkov⁺

Standard & Poor's Ratings Services considers that the role of enterprise risk management (ERM) is not only about having a framework and process to assess and control the downside of insurers' risk exposure; ERM is also about using the insights drawn from risk analyses to understand the upside of taking risks and managing exposure towards the best-rewarded risks within risk appetite constraints and available financial resources. We consider this to be an important part of effective management for insurers and we incorporate it into our rating analysis. Insurers with the most effective processes to optimise risk return should, over time, deliver higher risk-adjusted returns. The ability to outperform peers is a favourable factor in our rating analysis.

How S&P analyses the upside of risk management

Strategic risk management (SRM) forms a part of our ERM assessment, which is one of the factors determining ratings on insurers. While other aspects of our ERM analysis mainly focus on limiting the downside, SRM is also about the upside of risk management. It covers insurer's capabilities to optimise risk-adjusted returns and to prioritise strategic options consistently. The analysis focuses on the risk/reward rationale underlying the insurer's chosen strategy. It incorporates evidence of where the insurer has made strategic decisions using economic risk/reward metrics that are consistent with its risk appetite, and considers how an insurer balances other concerns, including regulatory and accounting considerations.

We assess SRM as positive, neutral or negative for all rated insurers. A positive SRM assessment is required (in addition to positive assessments in other key ERM factors) for a strong or very strong ERM assessment—these are the highest ERM assessments under our ratings criteria.

The SRM assessment is positive if the insurer executes consistent and effective risk/reward analysis in most of our key areas of analysis, including the company's strategic planning; product pricing and repricing; strategic asset allocation; reinsurance strategy and net retained risk profile; new risk-bearing initiatives (including mergers and acquisitions or entry into new markets); capital, or economic capital budgeting; and optimisation of risk-adjusted returns.

The score is positive only if an insurer demonstrates a history of successful execution of its strategic risk management programme, including, for example, better-than-peer risk-adjusted returns and a track record of successful mergers and acquisitions that is consistently accretive on a risk-adjusted basis.

We assess SRM as a neutral factor when an insurer uses some risk/reward analysis in decision-making, but applies the metrics and processes inconsistently across the company. The score could also be neutral if an insurer has developed an economic capital model and uses model results in the strategic risk management process, but the economic capital model has limited history or credibility.

When risk and risk/reward analysis is not adequately reflected in the insurer's decision-making, we assess the SRM as negative.

Consistent risk/return metric is key

We consider the key element for an effective SRM is to have a robust risk-adjusted profitability metric, with the risk element of that metric consistent with the insurer's economic capital model. We have observed that insurers not employing SRM usually fail to do so because they do not have a common measurement basis across all of their risks. Many insurers have recently moved to develop economic capital models, which provide a powerful tool that can be used as the common risk measure for SRM. While economic capital is most often the metric used to define

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risk in the risk/reward equation of SRM practitioners, economic capital by itself does not indicate that SRM is executed by an insurer.

A key challenge for insurers is to demonstrate that risk-adjusted profitability metrics are appropriate for different lines of business, covering both life and non-life, and business units operating under different regulatory and accounting regimes. Also, they need to be accepted by the decision-makers and recognised as adequately capturing the risk exposures and return characteristics of the exposure under consideration.

SRM starts with the planning process

In our view, a critical feature of positive SRM is that risk-adjusted metrics are explicitly used in the strategic planning process to inform the future business mix and risk profile. We review the process insurers follow in their strategic planning to determine an optimum risk/return profile within its risk appetite.

We recognise that a mathematically optimised business and risk portfolio may not be achievable in practice, and it is not realistic to expect that an insurer could significantly change its risk profile year-on-year. Nevertheless, in our analysis, we review how insurers adjust the business mix in response to material changes in the risk characteristics and the expected risk-adjusted profitability of different lines.

In our SRM assessment, we also focus on the process an insurer follows to monitor the risk-adjusted profitability it achieves, relative to the planned profitability targets. An insurer's pricing adequacy monitoring systems play a key role in that process. We see more extensive development and use of pricing adequacy monitoring systems for both life and non-life business. We observe that many companies have enhanced these systems to improve the consistency of measuring the profitability of different business lines relative to internal targets. Combined with improvements in the allocation of capital, this affords greater accuracy in determining the cost of capital used in these internal targets.

Our assessment of pricing adequacy systems does not just focus on their level of sophistication. In our assessment, it is also important to consider how insurers use these systems to improve the risk/return profile of their business by enforcing adequate pricing relative to the specific risk and capital characteristics of different lines of business. We recognise that it can be difficult to develop and apply such a system in practice, and in our discussions with insurers we focus on how they allow for their system's limitations.

We also consider in our SRM assessments how insurers address underperforming business units and product lines, in particular, whether an insurer has a clear plan to address the causes of the underperformance, or even to exit a segment of the market if the competitive environment over the strategic horizon will restrict the ability of the insurer to achieve an adequate return. We do not view favourably an insurer that tolerates underperforming lines solely to maintain its market share.

Optimising asset allocation and reinsurance protection

Our SRM assessment also incorporates whether strategic asset allocation (SAA) and reinsurance programme design utilise extensive risk/return analysis. We recognise that full optimisation may not be practical and other considerations also matter (for example, the stability of asset allocation and reinsurance programme).

While the use of risk/return optimisation for determining SAA has been more widely used in the industry, we observe that some insurers also have in place more-sophisticated approaches for designing their reinsurance programmes. A number of insurers employ internal models to regularly assess the value of these reinsurance programmes to optimise their risk/return profile. These assessments aim to measure an insurer's own view of its risk exposure against current market prices and conditions to manage its risk profile relative to its risk appetite, while at the same time optimising the costs and benefits of the reinsurance protection. Also, some insurers have been utilising the widespread availability and value of alternative risk-transfer instruments, such as insurance-linked securities (ILS) and sidecars. While we accept that qualitative considerations such as stability in the reinsurance programme and the importance of maintaining good relationships with reinsurers remain important, we view positively the increasing use of sophisticated quantitative analysis in designing those programmes.

Standard & Poor's believes that an insurer that practices SRM is, over time, more likely to make choices that maintain and improve its underlying profitability, while staying within its risk tolerance.

Complexity and Solvency II

By Tony Silverman*

The regulation of insurers perhaps inevitably involves some complexity. However, stepping back for a moment, the most prominent impression of the documentation for Solvency II is that it is dense, particularly complex and unlikely to be meaningfully accessible to a non-mathematician.

Even a simple addition, perhaps applying factors, is typically introduced in the standard formula documentation as a visually elaborate equation with extensive notation, followed by definitions of the notation. There is normally little, at best, preamble setting out what the equation does and the reasoning behind it. Root mean square calculations, correlation matrices and even more elaborate notation are common features of the specifications. The material reads, in truth, like a financial mathematics textbook.

Regulators must also contemplate supervising internal models, which can be hard to understand and normally involve, for example, stochastic simulation exercises driven by an economic scenario generator.

Does Solvency II need to be quite so complicated and should simplification eventually become an objective? This article discusses a selection of issues around Solvency II, for which complexity is a common theme.

We have to live with complexity

An advantage of detail in specifications is greater consistency of application, and a more uniform regulatory framework across territories certainly is one of the hoped-for advantages of Solvency II. Accuracy is, in principle, another advantage of complexity, though there are no guarantees in this respect. Hidden assumptions, insufficient challenge and over-engineering for a system that ultimately requires judgement as well to work properly, are among the issues that require management.

As regards complex documentation, it is a fact of life that legal documents, such as the [Delegated Acts and Implementing Technical Standards](#) (ITs), often are difficult to understand, but few would contest the principle "the simpler, the better".

Multiplicity of interested regulators will persist

It was initially hoped that Solvency II would simplify the management of large insurance companies through a reduction in the number of regulatory conversations for European insurers. Complexity was, in large part, seen as the price for an overarching system that would function across territories. However the outcome probably will disappoint by this measure.

New supervisory mechanisms are emerging that will function alongside the Solvency II process. The International Association of Insurance Supervisors (IAIS) has proposed a "basic capital requirement," which will be simple and factor based, will be applied to global systemically important insurers and will use factors at a level to achieve an appropriate outcome without the various diversification calculations that feature in the Solvency II standard formula. The IAIS released the calculation of the [Basic Capital Requirement](#) in October 2014. Initial industry reaction has been fairly muted.

The IAIS also is looking to implement a capital regulation project to apply to a more extensive list of internationally active insurers (IAIs).

In addition, although Solvency II will apply within the EU and at group level, other territories will still regulate local subsidiaries as they see fit.

Even within the EU, the role of national regulators has been enhanced by the recovery and resolution programme being pursued by the IAIS. On this issue, the IAIS is responding to a Financial Stability Board (FSB) initiative. Each national regulator is required by the FSB to demonstrate how it would ensure satisfactory resolution of an

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insurance company solvency issue, and they may therefore seek to ensure minimum levels of assets are available locally, adding again to the insurer universe of regulatory conversations.

The complexity of internal models presents a particular challenge for regulators, although their use remains a valuable option for some insurers. Regulators have had unhappy experiences with banks' internal models, which highlights the difficulties of using internal models as a medium for meaningful conversations. A consequence is that national regulators may use simplified, factor-based early warning indicators (EWIs) to inform their view of internal models. The Prudential Regulation Authority (PRA) in the U.K. has already embarked on this course.

"The PRA intends to monitor the on-going appropriateness of Solvency II internal models post approval through the use of early warning indicators." (Andrew Bailey, PRA CEO and Bank of England Deputy Governor, July 2013)

A.M. Best's approach to risk based capital and internal models

There are some similarities between the standard formula and A.M. Best's proprietary BCAR model in that both are factor based with allowances for diversification, but the BCAR model is a highly evolved tool which is used in a different context. For example the BCAR model is only one part of a rating methodology designed to discriminate between levels of solvency, analysts have a degree of discretion to make adjustments to the model as appropriate and A.M. Best normally completes the model on the basis of data supplied.

A.M. Best considers internal models primarily as part of its review of enterprise risk management (ERM), itself a key component of the rating process. Internal models should, in A.M. Best's view, inform decisions, but their results are expected to be appropriately challenged so that they can provide a valuable basis for discussion, and they are not expected to replace judgement.

Risk Margin

The definition of the risk margin has presented difficulties for insurers using internal models for Solvency II. It is defined as the cost of capital incurred in holding the Solvency Capital Requirement (SCR). The definition is circular in the sense that the SCR must be known to calculate the risk margin, but at the same time the risk margin is part of the technical liabilities, and the SCR is defined as the capital required to ensure technical liabilities are covered at a 1:200 confidence level. So the risk margin in each projection must be known to calculate the SCR.

In principle, solutions for the risk margin and SCR could be obtained through a process of nested simulations, though the number of simulations required then increases dramatically and becomes impractical. The issue is therefore normally tackled through approximations. An alternative would have been to set the risk margin by reference to a confidence level, say at 75 per cent.

Insurers' public financial reporting

Disclosure obligations, which recently have been clarified in an ITS, mean that Solvency II will add to a volume of public financial reporting for insurers that is high to start with, which acts as a barrier to the interest of generalist asset managers in the sector and, in the opinion of many, already deters investors. The complexity and disclosure of Solvency II data will be a considerable challenge for insurers seeking to engage with more generalist counterparties in public markets.

Looking forward

Now that the timetable for Solvency II appears more settled, it may be the right time to consider objectives beyond its implementation. Initially, solutions can sometimes be complex. But it must be a cause for concern that, whilst recognising the advantages of complex ideas where applicable, a sustainable system for a healthy industry is likely to look less complex than Solvency II.

"I would not give a fig for the simplicity this side of complexity, but I would give my life for the simplicity on the other side of complexity." (Oliver Wendell Holmes, U.S. Supreme Court Judge 1902–1932)

The EU Commission currently is committed to preparing a report on the operation of Solvency II by December 2018. It would be a worthwhile objective if the Commission took the opportunity to focus on simplification.

The Complexity Risk of Regulation: an Article on the Complexity of Solvency II

By Martin Eling⁺

Increasing complexity of regulation

The complexity of the financial system is undoubtedly increasing, and increasingly complex regulations has been the political response to this development. Beyond this background, in recent years a controversial discussion has emerged on the intensity, number and complexity of regulations in the insurance industry. Is the growing number and complexity of regulations the optimal answer to the financial world's increasing complexity? Many opinions argue that this is not necessarily true, and these opinions are not only provided by the industry. For example, Pottier and Sommer (2002) demonstrated that the equity-to-assets ratio is an equally good or even better indicator of financial distress than the much more complex U.S. risk-based capital (RBC) standards. Given these results, one might argue that an easy and clear regulation is the better model for handling the complexity of the real world.

Regarding the complexity of regulations, particularly the new EU insurance regulations, Solvency II has been the subject of much debate. The main goals of Solvency II are to protect policyholders and create a safe and sound industry. However, given the inherent complexity, it might be questionable as to whether Solvency II achieves its goals. The aim of this article is to outline why Solvency II might fail to achieve its goals and what the unintended consequences of the complexity of the new Solvency II regulations might be.

Will Solvency II be a black box?

Due to such complexity, one might argue that Solvency II is less comprehensible, less transparent and, thus, less effective. The model started with the first Quantitative Impact Study (QIS 1) with a technical description of only 8 pages; by QIS 5, it comprised 330 pages (not including the annexes). Only a few experts will be able to review the model completely. The risk is that, at the end of the day, Solvency II is a black box that only a few people will understand. Another layer of complexity is added by the use of different models in insurance companies (such as local GAAP, Solvency I, Solvency II, ratings, international financial reporting standards (IFRS), market consistent embedded value (MCEV)), which respond very differently under economic scenarios. This is of special concern as regulators want the managers of insurance companies to base their decisions on these models. What type of decisions will be made with the Solvency II model? Solvency II gives ineffective incentives, which are heavily influenced by political decisions.

Ineffective investment incentives

Market participants have already noticed that the new market-consistent valuation rules are having a significant impact on asset allocation. Solvency II encourages companies to hold a relatively undiversified portfolio of government bonds, as the required capital for these bonds is very low. This would counteract any macroprudential instruments with the goal to avoid risk. Basel III also favours sovereign debt, so interconnectedness and aligned behaviour between banks and insurers might increase. In addition, investments in low-rated and high-duration private-sector debt become less attractive, which might affect the ability of banks to issue long-term unsecured bonds (see European Commission, 2010, pp. 123, 131; Al-Darwish *et al.*, 2011; Kaserer, 2011; Fitch 2011).

However, whether Solvency II will affect insurance companies' investing strategies is not yet clear. Capital requirements for a BBB rating from S&P exceed those of the market risk module under the standard model of Solvency II. Thus, based on the assumption that insurers want to maintain a good rating, the influence of Solvency II on investing behaviour might not be as severe as it first appeared (see Höring, 2012, for life insurance companies, and a report by Morgan Stanley and Oliver Wyman, 2010, for non-life insurers). Nevertheless, it is absolutely

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unacceptable that capital requirements in the market risk module are not risk based, but instead, are based on political considerations (especially European governments' debt financing). If the larger insurers do not follow the wrong incentive because they want to maintain a good rating, then we might expect especially smaller non-rated insurers to invest in riskier government bonds. Solvency II thus promotes ineffective investment incentives.

Regulatory arbitrage

New regulations always cause concern regarding regulatory arbitrage, especially when they are very costly and complex. If entities in the financial services industry are regulated according to different principles, less restrictively regulated institutions could obtain a competitive advantage, and a run on the least restrictive regulatory environment might take place. Examples include:

- Banks versus Insurers: According to Solvency II, insurance companies must apply the fair value method with regard to assets and liabilities. In contrast, banks can use a hold-to-maturity approach for their banking book, which could be an advantage for the banking industry. However, it is not yet known whether the Solvency II capital requirements will indeed be tighter than those of Basel III. Furthermore, no empirical evidence exists as to what impact such a difference in capital requirements would have on competition.
- Systemically Important Financial Institutions (SIFI) versus Non-SIFI: As soon as an entity is labelled systemically important, a massive potential for moral hazard is created because such a designation guarantees that the bank or insurance company will receive a government bailout, if necessary (see, e.g. Grace, 2011; Harrington, 2011).
- European Insurers versus Rest-of-the-World Insurers: If capital requirements in the EU are too strict, risks might be transferred to non-EU insurers via reinsurance in order to lower the capital requirements and thus the cost of capital. This would be the case if other supervisory regimes considered to be equivalent are not appropriately set (see Al-Darwish *et al.*, 2011, pp. 21–53).

Despite such reasoning, one might think that the risk of regulatory arbitrage is minor from a macroprudential perspective. Since the AIG crisis, regulatory bodies all over the world have realised that there should not be any regulatory loopholes. However, regulatory arbitrage is still a significant problem that must be continuously monitored by regulators. For example, regulators in the United States recently realised that American life insurers increasingly cede their liabilities to affiliated and less regulated off-balance-sheet entities (so-called shadow reinsurers; see, Koijen and Yogo, 2014).

Conclusion

The aim of this article was to discuss the complexity of regulations and identify some of the unintended consequences that might arise. We used Solvency II as an example. Potential negative consequences are incentives for economically ineffective decisions and regulatory arbitrage. Yet it is absolutely unacceptable that capital requirements in the market risk module are not risk based, but instead based on political considerations. In addition, regulatory arbitrage is a significant problem that must be carefully examined by regulators. In general, the complexity of the model might make insurance regulation less comprehensible, less transparent, and thus less effective.

References

- Al-Darwish, A., Hafeman, M., Impavido, G., Kemp, M., O'Malley, P. (2011) *Possible Unintended Consequences of Basel III and Solvency II*, IMF Working Paper WP/11/187, Washington, DC: International Monetary Fund.
- European Commission (2010) *QIS5 Technical Specifications—Annex to Call for Advice from CEIOPS on QIS5*, Brussels: European Commission.
- Fitch (2011) *Solvency II Set to Reshape Asset Allocation and Capital Markets*, New York, NY: Fitch, Inc.
- Grace, M.F. (2011) *The Insurance Industry and Systemic Risk: Evidence and Discussion*, working paper, Georgia State University.
- Harrington, S.E. (2011) *Insurance regulation and the Dodd-Frank Act*, Policy Brief 2011-PB01, University of Pennsylvania.
- Höring, D. (2012) Will Solvency II market risk requirements bite? The impact of Solvency II on insurers' asset allocation, *The Geneva Papers on Risk and Insurance—Issues and Practice* 38(2): 250–273.
- Kaserer, C. (2011) *Solvency II and Basel III*, Finanzplatz München Initiative.
- Koijen, R.S., Yogo, M. (2014) *Shadow Insurance*, Swiss Finance Institute Research Paper No. 14-64, Geneva: Swiss Finance Institute.
- Morgan Stanley and Oliver Wyman (2010) *Solvency 2: Quantitative & Strategic Impact—The Tide is Going Out*.
- Pottier, S., Sommer, D. (2002) The Effectiveness of Public and Private Sector Summary Risk Measures in Predicting Insurer Insolvencies, *Journal of Financial Services Research* 21(1–2): 101–116.

The Upside of Risk Management: Delivering Fair and Appropriate Outcomes for Our Customers

Interview with Marco Vet⁺

How do you compare the insurance industry with other industries, in terms of customer satisfaction of products and services?

Generally speaking, I believe most of the customers of insurance companies are quite happy about their insurer. We see increased customer satisfaction due to more transparent products, better and more meaningful information provision on the purchase, and straightforward claims-handling processes. In that regard, I do not see a big difference between the insurance industry and other industries when it comes to customer satisfaction.

OK, there has been some room for improvement. Basically, customers expect the same from an insurance product as they would expect from any other product they buy like, for example, food and consumer electronics. They want to have a decent product that meets their expectations at a reasonable price, and that need has not always been met by the industry. Transparency is, for all the decisions that consumers take, absolutely key. They need to be in the position to assess both the quality and the price with relatively low effort. What makes insurance products a bit different from other products is the fact that the risks covered by the insurance policy can sometimes be complex and the time that passes between the purchase of the policy and the claim moment can be quite long. This especially counts for life policies. As a result, it is for a consumer not always easy to predict the quality of the product over the total lifetime. Furthermore, for some insurance products, these characteristics make it difficult to assess upfront whether the policy indeed serves their true needs and whether it is reasonably priced. At the same time, we should not exaggerate the difference. Not all the products are that complex, and there is a tendency towards more and more standardised products. Especially in the area of P&C insurance, we nowadays see products that are fairly easy to compare, and this makes the choice for customers easier. I definitely encourage this development and I do believe that, in the near future, insurance products will be further standardised. At the same time, there will always remain products that are more complex, given the nature of the risks they are supposed to cover. For these products, Insurers have the task to make sure the customer truly understands the risks that are covered via the policy. If a product is not suitable for the client, the insurer should give honest advice and direct her/him to other and better ways to cover their risks. The goal for an insurer should always be to deliver fair and appropriate outcomes for its customers! As we say within Achmea: the customer's voice needs to be a permanent factor in our business operations.

Can you give some examples of market misconducts that hurt the reputation of insurers?

Striking examples of misconduct are the private pensions scandal and, more recently, the PPI mis-selling in the U.K. market. A more nearby example for me is the life investments policies that were sold in the 80s and 90s in the Netherlands. Driven by advantageous fiscal treatment and booming stock markets, these policies were extremely popular. It looked as if nobody wanted to see the risks attached to these policies and there would be only winners in this game: the customers, the advisors and the insurance companies. Too good to be true and indeed, it was not true. It taught us as insurers some hard but necessary lessons on, for example, product development, cost loadings, and the impact bonus structures can have on the advice given to consumers. Furthermore it made clear to me that, for risky products, not only the best-case outcomes should be shown, but also what could happen in less favourable circumstances. Where we all expected to be winners, it now seems we have all become losers. The customers did not get what they wanted and lost quite some money; the advisors lost their clients' trust and the industry is faced with huge claims and reputation loss. It will certainly take some time to fully regain confidence from the customers. Nevertheless, I am convinced that Insurers are on the right track. When I look how product development in insurance companies currently works, I see that during the whole process, the question comes back: Is this product

⁺ Director of Risk and Compliance, Achmea.

in the interest of the customer and are the premium and the cost-loading fair? These are the questions we should ask ourselves and I am convinced that it will pay back and further restore the confidence customers have in insurance companies.

What the insurance industry and insurance regulators can do together to manage market conducts risks and increase the value of insurance for consumers?

I think a joint effort by the industry and insurance regulators is by far the best solution for managing market conduct risks. Given the fact that insurers exist by the grace of the confidence by consumers, it is extremely important that they manage the conduct risks. Self-regulation by insurers is for me, in principle, the preferred option, as this can count on full commitment by the industry. At the same time, there can be situations where it is good to have a regulator that issues clear rules that apply to all insurance providers in the market. Given the importance we attach as an insurance industry to managing the conduct risks such as those identified above, the CRO Forum decided to prepare a paper on this topic. In that paper we identified examples of sound risk management practices that can effectively help insurers to manage conduct risks. I definitely hope the examples in the paper inspire insurance companies to proactively strengthen their conduct risk management without awaiting measures from the regulator.

How can CROs Add Value to the Investment Side?

Interview with Douglas Caldwell⁺

Chief Risk Officer and Chief Investment Officers have different perspectives. How can CROs and CIOs work more closely, especially in designing the risk management tools and metrics?

The CRO and CIO should have the same goal, which is to maximise risk adjusted return within the constraints of the risk appetite of the organisation. Thus, the most important point is to work towards mutual agreement on the risk/return metrics and risk appetite constraints. This requires developing a common view of the facts and a common language for discussion. Once this is done, each should be free to operate in their own space while collaborating where necessary.

In the current low interest rate environment, there is pressure for increasing yields by taking on additional risks? Should the CRO resist or enable? How would you approach this?

My view is that risk management is first and foremost about creating transparency and ensuring decisions are made within the proper governance structure of the organisation. It is not necessarily the CRO that needs to say yes or no if the proper environment for information and decision-making is ensured. The CRO of course can have a view and must enforce agreed limits, but the decisions can then be left to the investment professionals. This is certainly important in a time of low interest rates where one can generally only follow rates down and maintain asset risk profile or take more asset risk. The CRO can help make sure it is clear what decisions are being made and if they are supported by proper governance.

Do you see capital market hedging as a strict mechanical process to follow, or do you think it is beneficial to give leeway for hedging execution?

I believe the answer is yes and yes. I could also say that "it depends". There are some hedging programmes, such as for variable annuity portfolios, where it is normally useful to be a strictly mechanical process. Where insurers have sold options that are highly volatile and risky, then a mechanical exercise aligned with an agreed risk profile is normally best. However, there are certain macro hedges and hedges at the margins of some portfolios where discretion may be best to allow for investment professional views. In all cases, the hedge programme and the level of discretion should be clearly approved in a hedging policy with appropriate limits.

⁺ Chief Risk Officer, NN Group.

Increasing Authority and Higher Organisational Profiles: 2014 Insurance CRO Survey²¹

By Bill Spinard⁺ and Chad Runchey⁺⁺

While the insurance sector has largely recovered from the economic impacts of the financial crises of 2008–2009, the risk management landscape remains forever changed. This is nowhere more evident than in the changing stature, authority and visibility of chief risk officers (CROs) across the industry.

The crisis afforded CROs the opportunity to demonstrate their value—an opportunity many seized by helping to de-risk balance sheets and navigate their companies through the turbulence. Today, intensifying and constantly changing regulatory, economic and competitive challenges means their skills remain in high demand. Indeed, there is a pervasive sense across the industry that risk management (and therefore CROs) have become essential to nearly all aspects of the business.

To understand the changing landscape, Ernst & Young (EY) insurance risk analysts interviewed chief risk officers and senior risk executives from more than 20 North American insurance companies.²² Collectively, the companies have significant business operations in all major sectors of the insurance industry, including property and casualty and life business. Further, respondents came from both mutual insurance and stock companies and from organisations under different regulatory regimes. We asked these executives questions related to CRO roles, regulation, organisation, risk quantification and future outlook.

The survey results highlight the ongoing evolution of the role and confirm the increasing impacts of regulations that resulted from the financial crisis. The events of a few years ago are still shaping the agendas of many CROs, even as their activities focus to a greater extent on the effectiveness of risk management policies and processes. Further, they are spending more time with their boards and senior business leaders—a fact that underscores the increased impact of many CROs on the business and that industry leaders have become more aware of CRO capabilities. That CROs are involved with more types of business issues is a testament to the value they have been adding to their organisations in the last several years and a harbinger of the opportunities that lie ahead.

We conducted the survey via interviews from October through December 2013 against the backdrop of increasing calls for coordinated regulatory regimes at national and international levels. As such, the answers reflect many of the mega-trends and major developments that were taking place in the broader sector during that time. It is particularly important to note that the majority of surveys were conducted before the release of the most recent report from the National Association of Insurance Commissioners (NAIC) regarding the content recommended for inclusion in the Own Risk and Solvency Assessment (ORSA) reports. Similarly, the Federal Insurance Office (FIO) released its report about the modernisation of insurance regulation after most of the surveys were completed. It is likely that insurance CROs may be rethinking their views on critical regulatory issues.

Several major themes can be seen in this year's results:

The expansion of CRO authority

CROs are spending more time interacting with boards and senior management. This higher organisational profile shows that insurers have on their radars a broader range of issues—including emerging risks such as cyberterrorism

²¹ This article is a reprint of the Joint CAS/CIA/SOA Risk Management Section Newsletter, December 2014.

⁺ Executive director and co-leader of EY's Insurance Risk Management Practice in McLean, Va.

⁺⁺ FSA, MAAA, is senior manager at EY in New York.

²² Ernst & Young (2014) [Increasing Authority And Higher Organizational Profiles: 2014 Insurance CRO Survey](#)

and data privacy. More important, it seems that these risks are more clearly perceived and considered more significant by the highest levels of executive leadership. That is certainly true when the 2014 survey results are compared with those from previous surveys. This may be evidence of CROs' success in identifying such risks and clarifying their potential impact on the business. There is a growing recognition that CROs bring a forward-looking perspective and a unique set of analytical tools that can help leadership understand the implications of emerging risks. In other words, CROs have seized the opportunity highlighted in survey results from 2013 and the trend of rising CRO prominence has continued.

One survey respondent described the evolution this way: "The CRO role is changing from being a 'brake' to being a 'copilot'. More knowledge of capital management and financial management will be required for CROs as they become decision-making members of the executive suite."

The seismic shift in both domestic and international regulations

It's difficult to overstate the potential impact of regulatory changes. Survey respondents described their effects as "tsunamis," and are clearly spending a lot of time thinking about the new regulatory regimes. As such concerns move up the corporate agenda, CROs are being asked to lead preparations and organise broad frameworks for the cumulative and interrelated effects of different layers of regulations. Efforts to comply with the ORSA recommendations are ongoing, but most companies are confident they have adequate plans in place and will meet the deadline. There is also a shared belief that the long-discussed international capital standards and group supervision will soon be an everyday reality. On the domestic front, there is a small but growing group of companies that want to upgrade the state-based regulatory system in the U.S., perhaps through the adoption of a hybrid model. These themes are being echoed across the industry. For instance, in an August 2013 report, the Financial Stability Board (FSB) criticised the state-based regulatory system and called upon the federal government to assume a greater role. The partial convergence of U.S. and international regimes is increasing the urgency of finding a common framework.

As one survey participant put it, "Trying to comply with changes in regulatory and accounting/actuarial environments at the same time is impossible. There is no one regulation that presents the biggest challenge, but rather the combination of all at the same time that makes this a hugely challenging process."

Shifts in the CRO focus—from survival to effectiveness

While low interest rates remain an issue, risk-management dialogues have shifted away from company survival (which was common in the immediate aftermath of the financial crisis) towards a more strategic and longer-term view of risk management effectiveness and decision support. There is a sense that balance sheets have been mostly de-risked to their desired level and investments are performing as expected. Thus, CROs can invest a higher proportion of their time and energy in other areas, such as seeking ways to embed more data-driven and analytics-based practices within their operations. The key question for many CROs has shifted from "are we doing the right things?" to "are we doing things right?" They are also seeking new patterns of engagement with the business. One survey participant commented that "the key is to improve dialogue with the board and key stakeholders on risk, and increase board knowledge of risk management."

Overall, the results make clear that the ongoing "risk journey" has entered an important new phase and that CROs will continue to have a seat at the table as their agendas and charters are aligned to the industry's top concerns. Thus, the evolution of the role of the CRO seems certain to continue. A diversified set of responsibilities and increasing priorities will place a premium on communication and lead to more direct engagement with the board and senior business leadership. Meanwhile, the proliferating risks faced by insurers are likely to fuel further expansion of authority for CROs, as well as influence the ways they interact with the business.

At the same time, it is impossible to overestimate the profound impacts of regulatory change. There can be no doubt that CROs have a larger role to play—as well as more value to add—in shaping the conversation with regulators and in helping their companies prepare for compliance with these new demands. Despite the turbulence and shifts that CROs face in their daily jobs, it is no coincidence that their increased focus on the effectiveness of their efforts resulted in raising the organisational profile of the risk management function and increasing its value contribution to the business.

In Memoriam: Hans Peter Boller

By Bruno Porro⁺

Peter studied industrial economics (*Wirtschaftsingenieurwesen*) at the University of Karlsruhe, specialising in insurance. In 1995 he passed his PhD exams with Prof. Christian Hipp on the application of finance theory to (re)insurance.

While working on his PhD, he started his professional career as a consultant with Tillinghast in London. Later he moved to the Cologne office, where he was responsible for launching the claims consulting initiatives. In 1999, he moved to Zurich and joined Zurich Financial Services with the responsibility for in- and outwards reinsurance. When Zurich put its reinsurance activities on the market through an IPO, Peter became the chief actuary of Converium for non U.S. business. In 2003, he was promoted to the position of Chief Risk Officer, joined the Group Board and became responsible for risk management and actuarial work.

In 2007, he was co-founder and managing partner with Secquaero, a company specialised in consulting (re)insurance companies for implementation of (internal) risk models and helping them to get approval from supervisory authorities.

In parallel to his company work, Peter was a long-time member of the German Actuarial Association (DAV), where he specialised in all issues related to insurance claims. For more than 10 years, he engaged in international projects, for instance, as founding chairman of the IAA subcommittee on reinsurance, as co-author of the so called Blue Book (*A Global Framework for Insurer Solvency Assessment*, 2004). He was a qualified actuary in Germany and Switzerland, and Chairman of ASTIN (Non-life section of the IAA).

He also was a founding member of the Chief Risk Officer (CRO) Forum and actively participated in the Annual Round Table of Chief Risk Officers (ART of CROs) of The Geneva Association, as well as the CRO Academy.

Peter was an outstanding professional and, at the same time, an invaluable friend, always supporting initiatives and sharing his experience, spanning more than 25 years in consulting, research and management. He died unexpectedly at the age of 52 on 6 November 2014. Our deepest sympathy goes to his wife Anja and their three children.

⁺ Former CRO of SwissRe and Chairman of the ART of CROs.

THE RESEARCH PROGRAMME ON RISK MANAGEMENT

The Risk Management Research programme is an integral part of The Geneva Association's dialogue with economic and academic actors in order to emphasise the role of insurance in a modern service economy.

The focus of the Risk Management programme is:

- to provide a platform between the insurance community; the engineering and academic communities; and policymakers to discuss issues on balancing risks and opportunities;
- to be a facilitator for the chief risk officers (CROs) of The Geneva Association and CROs in general;
- to foster the use of risk assessment tools and risk management in new fields of application; such as policymaking;
- to promote the concept of the insurability of risks as the "natural" borderline between State legislation and the market economy;
- to identify new opportunities for insurers in the emerging sustainability concept in order to enlarge the field of insurable and insured risks; and
- to research and illustrate the new risks in the emerging service economy, based on an extended performance responsibility of economic actors.

The Geneva Association

The Geneva Association is the leading international insurance think tank for strategically important insurance and risk management issues.

The Geneva Association identifies fundamental trends and strategic issues where insurance plays a substantial role or which influence the insurance sector. Through the development of research programmes, regular publications and the organisation of international meetings, The Geneva Association serves as a catalyst for progress in the understanding of risk and insurance matters and acts as an information creator and disseminator. It is the leading voice of the largest insurance groups worldwide in the dialogue with international institutions. In parallel, it advances—in economic and cultural terms—the development and application of risk management and the understanding of uncertainty in the modern economy.

The Geneva Association membership comprises a statutory maximum of 90 Chief Executive Officers (CEOs) from the world's top insurance and reinsurance companies. It organises international expert networks and manages discussion platforms for senior insurance executives and specialists as well as policymakers, regulators and multilateral organisations. The Geneva Association's annual General Assembly is the most prestigious gathering of leading insurance CEOs worldwide.

Established in 1973, The Geneva Association, officially the "International Association for the Study of Insurance Economics," has offices in Geneva and Basel, Switzerland and is a non-profit organisation funded by its Members.

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FORTHCOMING CONFERENCES OF THE GENEVA ASSOCIATION

2015

February

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| 19 | Basel | 31 st Regulation and Supervision (PROGRES) Seminar |
| 20 | Basel | 2 nd International Colloquium on International Capital Standards |

March

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| 6 | Zurich | The Geneva Association/IAIS High-Level Meeting, hosted by The Geneva Association (Board members only) |
| 16 | Sendai | The Geneva Association's Public Forum Event at the Third UN World Conference on Disaster Risk Reduction "Insurance as contributors to problem solving and impact reduction", co-organised with the Tokio Marine & Nichido Fire Insurance |
| 25 | Paris | 17 th Meeting of the Annual Circle of Chief Economists (ACCE), hosted by SCOR (ACCE members only) |

May

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| 13–16 | Singapore | 42 nd General Assembly of The Geneva Association, hosted by the Monetary Authority of Singapore (Members only) |
| 28–29 | Berlin | 16 th Joint Seminar of the European Association of Law and Economics (EALE) and The Geneva Association |

August

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| 2–6 | Munich | 3 rd World Risk and Insurance Economics Congress (WRIEC), organised by EGRIE in cooperation with APRIA, ARIA and The Geneva Association |
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October

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| 20 | Munich | 9 th Geneva Association Meeting of Chief Investment Officers, hosted by Allianz Investment Management (CIO members only) |
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November

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| 16–17 | Singapore | 12 th Health and Ageing Conference on "Insuring health-care for the elderly in Asia", co-organised with the Singapore College of Insurance |
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2016

June

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| 8–11 | Rome | 43 rd General Assembly of The Geneva Association, hosted by the Italian Members (Members only) |
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