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How (re)insurers are managing accumulation risk

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EXPOSURE

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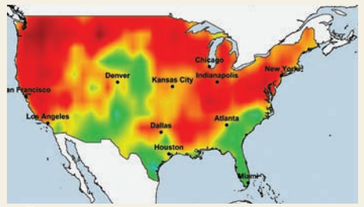

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FOREWORD

A TIME TO CHALLENGE CONVENTION

Welcome to the second edition of EXPOSURE, the RMS publication on catastrophe and risk management practices.

The risk and insurance industry is truly at an inflection point. The pace of change is accelerating, and many of the challenges of today's market are just the symptoms of a deeper shift in the ecosystem of risk and capital. All of us must move quickly to innovate, adapt and deliver new solutions if we are to thrive. As a creature of this market, this applies to RMS as well.

In this edition of EXPOSURE, we explore the dynamics of an industry challenging conventions on almost every front. How new insights on medium-term rates suggest increased volatility and how new seismic science reveals fatter tails. On the changing nature of terrorism risk, and how new threats create opportunities for cyber insurance. On managing changes in the market, while staying true to the fundamentals. How technology and analytics are reshaping the playing field, and creating new imperatives to ensure competitive advantage. And why this all matters, given the urgent opportunity to scale the market and close the protection gap to ensure a more resilient global society.

I hope you find this edition of EXPOSURE a valuable resource as you continue to improve your understanding of risk to see and achieve new opportunities for your business.

Regards,

HEMANT SHAH
CEO and co-founder, RMS, Inc.

NEWS ANALYSIS

GLOBAL TERRORISM

PEOPLE AND PUBLIC PLACES INCREASINGLY IN THE FIRING LINE

The attempted machete attack on the Louvre Museum in Paris on February 2 is indicative of the changing terrorism threat environment

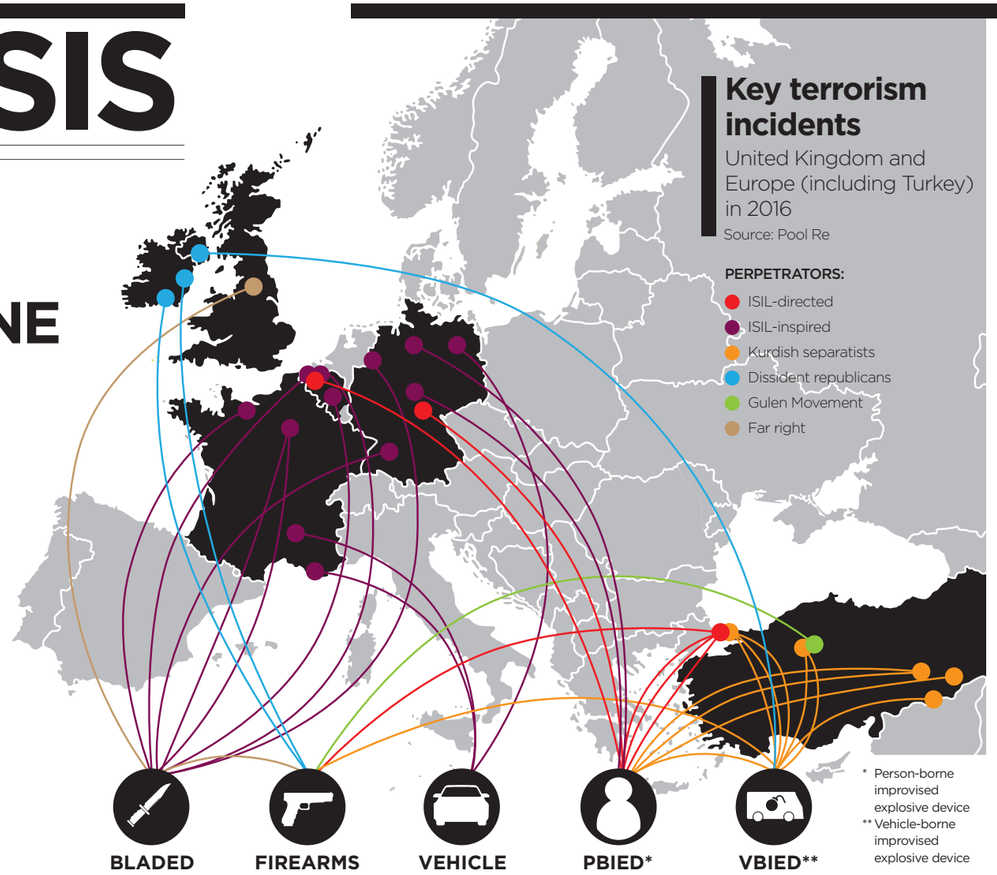
Attacks carried out by lone individuals targeting civilians with guns, knives and even trucks – as was the case in Nice and the Berlin Christmas market attacks – are on the rise in OECD countries. Seventy percent of all deaths from terrorism in the West since 2006 have been perpetrated by lone actors, according to the Global Terrorism Index.

This is in large part a result of significant improvements in counterterrorism and surveillance, which has increased the likelihood of complex plots being intercepted, explains Gordon Woo, catastrophist at RMS. The mass surveillance, which was made known to the public by NSA whistleblower Edward Snowden in 2013, has helped to foil a significant number of major plots.

This includes the 2006 liquid bomb plot, which could have surpassed 9/11 in impact if it had fallen through the cracks, thinks Woo. "Within the Five Eyes Alliance, all the major plots since 9/11 – those involving over half a dozen operatives – have been stopped. This would not have been possible without intensive surveillance."

Because of high per capita spending on counterterrorism in many other countries, would-be attackers have followed the path of least resistance in their choice of weaponry and mode of attack, he explains. "Since 9/11, it's become harder to get hold of fertilizer to make bombs, so terrorists have shifted attack mode from chemical energy through bombs and explosives to, for instance, kinetic energy stored up in moving vehicles. A 40-ton truck travelling at 30mph (as was the case in Berlin) can cause as much damage as a bomb."

The property losses arising from lone actors with guns or knives, or marauding firearms attacks that focus on soft targets, are significantly less than those involving improvised explosive devices (IEDs).



However, businesses are exposed in other ways. This includes the threat to their staff and potential business interruption losses.

In France, the GDP contribution from tourism fell by US$1.7 billion between 2014 and 2015 following the January 7, 2015 Charlie Hebdo shooting and November 2015 Paris attacks. "All the terrorism carriers and pools are trying to become more relevant and looking at what cover they can provide for business interruption or some kind of restriction on business because of damage to infrastructure," explains Woo.

"Direct economic loss, such as from property damage, may be minor compared with the indirect economic drain from interruption to tourism and other businesses," he continues. "Measures to improve resilience against indirect economic losses from terrorism require new insurance solutions."

While smaller attacks focused on soft targets remain the most likely form of terrorism risk, the threat of a major, complex attack has not disappeared. Groups such as ISIL and AQAP (Al-Qaeda in the Arabian Peninsula) seek to inspire and radicalize lone attackers but maintain their goal of waging "spectaculars" against Western countries.

The return of experienced foreign fighters from Iraq and Syria could prove a significant challenge for security agencies and governments, noted the UK's Pool Re in its 2017 terrorism outlook. It also anticipates ISIL's so-called Caliphate will become more "virtual" as it continues to make use of the Internet and social media to influence and gain access to sympathetic individuals.

HURRICANE FORECAST

A DIFFERENT DISTRIBUTION OF RISK

RMS's latest medium-term rate (MTR) forecast for North Atlantic hurricane activity in the next five years dipped just below the long-term rate across the U.S. – the first time since RMS introduced the MTR in 2006. This key insight into changing hurricane activity has important business impacts for (re)insurers

Validating the numbers

The MTR forecast is based on the combined outputs of 13 statistical models spanning SSTs models, 'shift' models that identify periods of high and low activity in historic data, and 'active baseline' models that recognize the distorting influence of aerosol gases on hurricane activity in the 1970s and 1980s. Creating 'what-if' 5-year storm forecasts from 1970 to 2016 and comparing results with actual observations, the MTR forecasts have outperformed long-term rate forecasts on 75 percent of occasions.

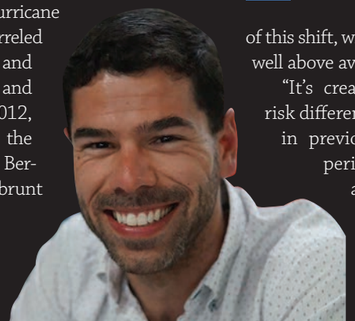
"From a pricing perspective, I would expect the MTR to give insurers food for thought, particularly given the market-wide decline in hurricane risk pricing in recent years," Tom Sabbatelli (pictured), senior product manager in the RMS hurricane modeling team, explains. "But it also might impact on regional reinsurance buying activity – buyers might want to factor these findings into their purchasing strategies for the northeast U.S."

The change to the forecast has been brought about by a combination of warm North Atlantic sea-surface temperatures (SSTs) and the steering force of atmospheric pressure systems which are driving an above average risk of hurricane activity along the northeast U.S. and maritime Canada.

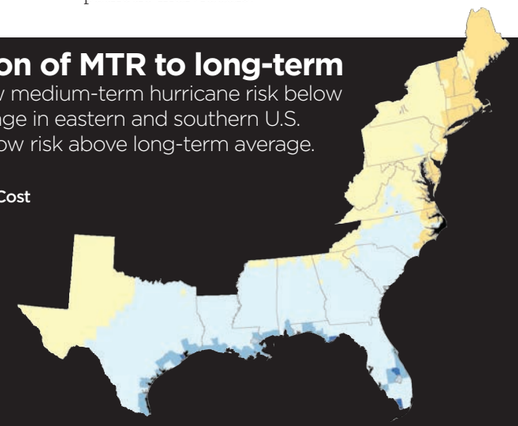
"Above average Atlantic SSTs are expanding the area over which hurricanes can develop and intensify," explains Sabbatelli. "They are also shifting that zone further east towards Africa, and by so doing extending the period that hurricanes can harvest the warm-water energy needed to intensify." This eastward shift, in evidence in the MTR forecasts for the last five years, is also heightening the directional influence of high pressure areas such as the Bermuda High.

"These atmospheric conditions and SSTs," he continues, "are creating a geographical corridor that is funneling a greater number of hurricanes between the U.S. eastern seaboard and Bermuda."

This steering effect was evident in the storm tracks of Hurricane Irene in 2011, which barreled through the Caribbean and up the U.S. east coast, and Superstorm Sandy in 2012, which tracked along the northeast coastline. Bermuda is also taking the brunt of this shift, with hurricane activity well above average in recent years.



"It's creating a distribution of risk different to what we have seen in previous inactive hurricane periods," he says, "with above average risk for the U.S. northeast, and below average for hurricane-prone regions such as Florida and Texas." While, of course, in absolute terms these hurricane hotspots remain much more highly-exposed than the northeast, (re) insurers should take note of the shifting regional contributions.



INSIDE TRACK

PUTTING CUSTOMERS FIRST: DELIVERING VALUE AND IMPACT

On March 1, a highly influential figure on the global insurance stage joined the ranks at RMS. For the past several decades, industry veteran Mike Pritula has advised leading organizations throughout the industry on boosting business performance, enhancing operational efficiencies and honing growth strategies. As he takes up his role as president of RMS, EXPOSURE finds out what client service means to him

For Mike Pritula, every client partnership he has forged over the years has been guided by one simple principle – that everything you do must add value and deliver impact. "You have to ensure that the services you provide deliver the greatest impact for the client," he says. "To do that you must be focused on their needs, understand what those needs are and be able to respond to them fully – that's how you deliver demonstrable value-added."

In his view, one of the most significant and transformative value generators currently available to insurance practitioners is the power of data analytics to optimize performance. "The insurance sector is the original data-driven industry," he says, "and can trace its data heritage back to the first meetings in the Lloyd's Coffee House over 300 years ago. Today, the immense amounts of data at our disposal continue to push our industry forward, but we now have the computing horsepower and the analytical capacity through machine learning and artificial intelligence to ride that wave much better than ever before."

In fact, it is this data-driven potential that was a key factor in his decision to join RMS. "When you look at where RMS sits in this rapidly expanding digital ecosystem, it is right at the core. You simply could not be better positioned to help move this data evolution forward. The firm has an eagle's-eye view across the industry from its Silicon Valley perch and can fully exploit its scientific and technological proficiency to help accelerate the ability of clients to capitalize on this exponential increase in data through better models, software and services."

The industry is already taking significant strides along an increasingly digitized highway, with advanced analytical techniques now supporting improved underwriting decision-making and enhanced risk assessment, while also driving efficiencies in claims-handling procedures and helping reduce fraudulent activity. However, the speed at which the industry can travel along this road is governed by a number of factors.

"You have to remember that at the end of the data analysis process, unlike many other sectors, our industry has to back up its conclusions with significant amounts of risk-based capital," Pritula explains. "As a (re)insurer, you can't simply grab hold of bleeding edge technology; you have to introduce these capabilities incrementally, constantly testing as you move forward, to ensure you safeguard the capital that will ultimately back up the decisions you make. Furthermore, you have regulatory requirements that will influence what data you can use, which will also affect how fast you can accelerate."

While acknowledging that current market conditions are challenging, he believes that the ability these new technologies provide to push the insurance envelope is spawning many more opportunities than risks. "We have to see the economic potential that can be generated by these advanced capabilities and work to move our industry towards that potential. There are opportunities provided by new risks that are emerging every day – we just need to get better at using these tools to identify, assess and underwrite these risks. It also greatly enhances our ability to tackle the ever-expanding protection gap. Through enhanced modeling capabilities, we can build the solutions that can close this gap and help enhance societal resilience."

"WE HAVE TO SEE THE ECONOMIC POTENTIAL THAT CAN BE GENERATED BY THESE ADVANCED CAPABILITIES AND WORK TO MOVE OUR INDUSTRY TOWARDS THAT POTENTIAL"

He also highlights the need for (re)insurers to capitalize on new data insights to look beyond the boundaries of the insurance policy. "We must recognize that we are moving more and more towards a 'predict and prevent' world," he points out. "Acknowledging this fact, and working with our clients to help prevent the losses from occurring through better use of the data sets at our disposal, rather than focusing on creating a product for when those losses happen will, I believe, prove a significant differentiator for the companies of tomorrow."

The potential to embed greater automation into every part of the insurance system will also have a major influence on how the sector evolves. "There is no doubt that this increased digitization will inject further automation and more AI-driven efficiencies into the entire insurance system," he adds, "from intermediary to insurer to reinsurer to service provider. Companies have to embrace this and recognize that it will significantly impact their business and will likely create an environment that is less people-intensive."

The question of course is, to what extent will companies be willing to embrace this new digital world? Pritula highlights the fact that the banking sector is addressing a similar question with the advent of Blockchain. "That industry is having to take a very hard look at this new technology – including Bitcoin – and the potential it has to fundamentally change the movement of money and the recording of transactions throughout the banking system. Blockchain has the power to impact every participant in the sector's value chain. Each link must decide what posture they will adopt towards understanding and applying this technology."

Another key factor affecting how the insurance market transitions to a more data-driven, digitized environment, is its ability to shift its talent base to one more attuned to these new analytical capabilities. "This has to be a priority for management teams – how will they attract and develop this more technically-oriented workforce?"

In his view, half of the battle to bring on board the Millennials is already won. "Talented young people want a job that will challenge and stimulate them," he states, "and I can honestly say that in my several decades tackling strategic and operational issues at all levels, this industry is facing problems to rival any faced by companies like Google, Facebook or Tencent. What we need to do is promote these challenges better and then ensure that we offer a dynamic working environment in which digital natives can thrive."

"We have to accept that the insurance product is a highly complex one – much more so than any other product available in the financial services arena," he concludes. "This inherent complexity will influence the pace at which the industry can transition. However, we are all technologists now. Any executive in the insurance market who is not deeply literate and conversant in these new technologies is at risk of not stewarding their organization as effectively and efficiently as they can."

Career highlights

Mike Pritula joins RMS after a distinguished 35-year career at McKinsey & Company, where he worked closely with leading international insurers, reinsurers, brokers, and industry associations on all facets of improving business performance.

Mike has helped develop and implement growth strategies for leading participants in the industry, has worked on enhancing operational performance across all functions, and has helped senior executives to improve their organization's effectiveness.

THE FUTURE OF (RE)INSURANCE:

EVOLUTION OF THE INSURER DNA

The (re)insurance industry is at a tipping point. Rapid technological change, disruption through new, more efficient forms of capital and an evolving risk landscape are challenging industry incumbents like never before. Inevitably, as EXPOSURE reports, the winners will be those who find ways to harmonize analytics, technology, industry innovation, and modeling

There is much talk of disruptive innovation in the insurance industry. In personal lines insurance, disintermediation, the rise of aggregator websites and the Internet of Things (IoT) – such as connected car, home, and wearable devices – promise to transform traditional products and services. In the commercial insurance and reinsurance space, disruptive technological change has been less obvious, but behind the scenes the industry is undergoing some fundamental changes.

The tipping point

The 'Uber' moment has yet to arrive in reinsurance, according to Michael Steel, global head of solutions at RMS. "The change we're seeing in the industry is constant. We're seeing disruption throughout the entire insurance journey. It's not the case that the industry is suffering from a short-term correction and then the market will go back to the way it has done business previously. The industry is under huge competitive pressures and the change we're seeing is permanent and it will be continuous over time."

Experts feel the industry is now at a tipping point. Huge competitive pressures, rising expense ratios, an evolving risk landscape and rapid technological advances are forcing change upon an industry that has traditionally been considered somewhat of a laggard. And the revolution, when it comes, will be a quick one, thinks Rupert Swallow, co-founder and CEO of Capsicum Re.

Other sectors have plenty of cautionary tales on what happens when businesses fail to adapt to a changing world, he explains. "Kodak was a business that in 1998 had 120,000 employees and printed 95 percent of the world's photographs. Two years later, that company was bankrupt as digital cameras built their presence in the marketplace. When the tipping point is reached, the change is radical and fast and fundamental."

While it is impossible to predict exactly how the industry will evolve going forward, it is clear that tomorrow's leading (re)insurance companies will share certain attributes. This includes a strong appetite to harness data and invest in new technology and analytics capabilities, the drive to differentiate and design new products and services, and the ability to collaborate. According to Eric Yau, general manager of software at RMS, the goal of an analytic-driven organization is to leverage the right technologies to bring data, workflow and business analytics together to continuously drive more informed, timely and collaborative decision making across the enterprise.

"New technologies play a key role and while there are many choices with the rise of insurtech firms, history shows us that success is achieved only when the proper due diligence is done to really understand and assess how these technologies enable the longer term business strategy, goals and objectives," says Yau.

Yau says one of the most important ingredients to success is the ability to effectively blend the right team of technologists, data scientists and domain experts who can work together to understand and deliver upon these key objectives.

The most successful companies will also look to attract and retain the best talent, with succession planning that puts a strong emphasis on bringing Millennials up through the ranks. "There is a huge difference between the way Millennials look at the workplace and live their lives, versus industry professionals born in the 1960s or 1970s — the two generations are completely different," says Swallow. "Those guys [Millennials] would no sooner write a cheque to pay for something than fly to the moon."

Case for collaboration

If (re)insurers drag their heels in embracing and investing in new technology and analytics capabilities, disruption could well come from outside the industry. Back in 2015, Lloyd's CEO Inga Beale warned that insurers were in danger of being "Uber-ized" as technology allows companies from Google to Walmart to undermine the sector's role of managing risk.

Her concerns are well founded, with Google launching a price comparison site in the U.S. and Rakuten and Alibaba, Japan and China's answers to Amazon respectively, selling a range of insurance products on their platforms.

"No area of the market is off-limits to well-organized technology companies that are increasingly encroaching everywhere," says Rob Procter, CEO of Securis Investment Partners. "Why wouldn't Google write insurance… particularly given what they are doing with autonomous vehicles? They may not be insurance experts but these technology firms are driving the advances in terms of volumes of data, data manipulation, and speed of data processing."

Procter makes the point that the reinsurance industry has already been disrupted by the influx of third-party capital into the ILS space over the past decade to 15 years. Collateralized products such as catastrophe bonds, sidecars and non-traditional reinsurance have fundamentally altered the reinsurance cycle and exposed the industry's inefficiencies like never before.

"We've been innovators in this industry because we came in ten or 15 years ago, and we've changed the way the industry is structured and is capitalized and how the capital connects with the customer," he says. "But more change is required to bring down expenses and to take out what are massive friction costs, which in turn will allow reinsurance solutions to be priced competitively in situations where they are not currently.

"It's astounding that 70 percent of the world's catastrophe losses are still uninsured," he adds. "That statistic has remained unchanged for the last 20 years. If this industry was more efficient it would be able to deliver solutions that work to close that gap."

Collaboration is the key to leveraging technology – or insurtech – expertise and getting closer to the original risk. There are numerous examples of tie-ups between (re)insurance industry incumbents and tech firms. Others have set up innovation garages or bought their way into innovation, acquiring or backing niche start-up firms. Silicon Valley, Israel's Silicon Wadi, India's tech capital Bangalore and Shanghai in ➔

"WE'RE SEEING DISRUPTION THROUGHOUT THE ENTIRE INSURANCE JOURNEY"

— MICHAEL STEEL, RMS

China are now among the favored destinations for scouting visits by insurance chief innovation officers.

One example of a strategic collaboration is the MGA Attune, set up last year by AIG, Hamilton Insurance Group, and affiliates of Two Sigma Investments. Through the partnership, AIG gained access to Two Sigma's vast technology and data-science capabilities to grow its market share in the U.S. small to mid-sized commercial insurance space.

"The challenge for the industry is to remain relevant to our customers," says Steel. "Those that fail to adapt will get left behind. To succeed you're going to need greater information about the underlying risk, the ability to package the risk in a different way, to select the appropriate risks, differentiate more, and construct better portfolios."

Investment in technology in and of itself is not the solution, thinks Swallow. He thinks there has been too much focus on process and not enough on product design. "Insurtech is an amazing opportunity but a lot of people seem to spend time looking at the fulfilment of the product – what 'Chily' [Swallow's business partner and industry guru Grahame Chilton] would call 'plumbing'.

"In our industry, there is still so much attention on the 'plumbing' and the fact that the plumbing doesn't work, that insurtech isn't yet really focused on compliance, regulation of product, which is where all the real gains can be found, just as they have been in the capital markets," adds Swallow.

Taking out the friction

Blockchain however, states Swallow, is "plumbing on steroids". "Blockchain is nothing but pure, unadulterated, disintermediation. My understanding is that if certain events happen at the beginning of the chain, then there is a defined outcome that actually happens without any human intervention at the other end of the chain."

In January, Aegon, Allianz, Munich Re, Swiss Re, and Zurich launched the Blockchain Insurance Industry Initiative, a "$5 billion opportunity" according to PwC. The feasibility study will explore the potential of distributed ledger technologies to better serve clients through faster, more convenient and secure services.

"BLOCKCHAIN FOR THE REINSURANCE SPACE IS AN EFFICIENCY TOOL. AND IF WE ALL GET MORE EFFICIENT, YOU ARE ABLE TO INCREASE INSURABILITY BECAUSE YOUR PRICES COME DOWN"

— KURT KARL, SWISS RE

Blockchain offers huge potential to reduce some of the significant administrative burdens in the industry, thinks Kurt Karl, chief economist at Swiss Re. "Blockchain for the reinsurance space is an efficiency tool. And if we all get more efficient, you are able to increase insurability because your prices come down, and you can have more affordable reinsurance and therefore more affordable insurance. So I think we all win if it's a cost saving for the industry."

Collaboration will enable those with scale to behave like nimble start-ups, explains Karl. "We like scale. We're large. I'll be blunt about that," he says. "For the reinsurance space, what we do is to leverage our size to differentiate ourselves. With size, we're able to invest in all these new technologies and then understand them well enough to have a dialogue with our clients. The nimbleness doesn't come from small insurers; the nimbleness comes from insurance tech start-ups."

He gives the example of Lemonade, the peer-to-peer start-up insurer that launched last summer, selling discounted homeowners' insurance in New York. Working off the premise that insurance customers lack trust in the industry, Lemonade's business model is based around returning premium to customers when claims are not made. In its second round of capital raising, Lemonade secured funding from XL Group's venture fund, also a reinsurance partner of the innovative new firm. The firm is also able to offer faster, more efficient, claims processing.

"Lemonade's [business model] is all about efficiency and the cost saving," says Karl. "But it's also clearly of benefit to the client, which is a lot more appealing than a long, drawn-out claims process."

Tearing up the rule book

By collecting and utilizing data from customers and third parties, personal lines insurers are now able to offer more customized products and, in many circumstances, improve the underlying risk. Customers can win discounts for protecting their homes and other assets, maintaining a healthy lifestyle and driving safely. In a world where products are increasingly designed with the digital native in mind, drivers can pay-as-they-go and property owners can access cheaper home insurance via peer-to-peer models.

Reinsurers may be one step removed from this seismic shift in how the original risk is perceived and underwritten, but just as personal lines insurers are tearing up the rule book, so too are their risk partners. It is over 300 years since the first marine and fire insurance policies were written. In that time (re)insurance has expanded significantly with a range of property, casualty, and specialty products.

However, the wordings contained in standard (re)insurance policies, the involvement of a broker in placing the business and the face-to-face transactional nature of the business – particularly within the London market – has not altered significantly over the past three centuries. Some are questioning whether these traditional indemnity products are the right solution for all classes of risk.

"We think people are often insuring cyber against the wrong things," says Dane Douetil, group CEO of Minova Insurance. "They probably buy too much cover in some places and not nearly enough in areas where they don't really understand they've got a risk. So we're starting from the other way around, which is actually providing analysis about where their risks are and then creating the policy to cover it."

"There has been more innovation in intangible type risks, far more in the last five to ten years than probably people give credit for. Whether you're talking about cyber, product recall, new forms of business interruption, intellectual property or the huge growth in mergers and acquisition coverages against warranty and indemnity claims – there's been a lot of development in all of those areas and none of that existed ten years ago."

Closing the gap

Access to new data sources along with the ability to interpret and utilize that information will be a key instrument in improving the speed of settlement and offering products that are fit for purpose and reflect today's risk landscape. "We've been working on a product that just takes all the information available from airlines, about delays and how often they happen," says Karl. "And of course you can price off that; you don't need the loss history, all you need is the probability of the loss, how often does the plane have a five-hour delay?"

"All the travel underwriters then need to do is price it 'X', and have a little margin built-in, and then they're able to offer a nice new product to consumers who get some compensation for the frustration of sitting there on the tarmac."

With more esoteric lines of business such as cyber, parametric products could be one solution to providing meaningful coverage for a rapidly-evolving corporate risk. "The corporates of course want indemnity protection, but that's extremely difficult to do," says Karl. "I think there will be some of that but also some parametric, because it's often a fixed payout that's capped and is dependent upon the metric, as opposed to indemnity, which could well end up being the full value of the company. Because you can potentially have a company destroyed by a cyber-attack at this point."

One issue to overcome with parametric products is the basis risk aspect. This is the risk that an insured suffers a significant loss of income, but its cover is not triggered. However, as data and risk management improves, the concerns surrounding basis risk should reduce.

Improving the underlying risk

The evolution of the cyber (re)insurance market also points to a new opportunity in a data-rich age: pre-loss services. By tapping into a wealth of claims and third-party data sources, successful (re)insurers of the future will be in an even stronger position to help their insureds become resilient and incident-ready. In cyber, these services are already part of the package and include security consultancy, breach-response services and simulated cyber attacks to test the fortitude of corporate networks and raise awareness among staff. "We've heard about the three 'Vs' when harnessing data – velocity, variety, and volume – in our industry we need to add a fourth, veracity," says Yau. "When making decisions around which risks to write, our clients need to have allocated the right capital to back that decision or show regulators what parameters fed that decision."

IoT is not just an instrument for personal lines. Just as insurance companies are utilizing data collected from connected devices to analyze individual risks and feedback information to improve the risk, (re) insurers also have an opportunity to utilize third-party data. "GPS sensors on containers can allow insurers to monitor cargo as it flows around the world – there is a use for this technology to help mitigate and manage the risk on the front end of the business," states Steel.

Information is only powerful if it is analyzed effectively and available in real-time as transactional and pricing decisions are made, thinks RMS' Steel. "The industry is getting better at using analytics and ensuring the output of analytics is fed directly into the hands of key business decision makers."

"It's about using things like portfolio optimization, which even ten years ago would have been difficult," he adds. "As you're using the technologies that are available now you're creating more efficient capital structures and better, more efficient business models."

Minova's Douetil thinks the industry is stepping up to the plate. "Insurance is effectively the oil that lubricates the economy," he says. "Without insurance, as we saw with the World Trade Center disaster and other catastrophes, the whole economy could come to a grinding halt pretty quickly if you take the 'oil' away."

"That oil has to continually adapt and be innovative in terms of being able to serve the wider economy," he continues. "But I think we do a disservice to our industry by saying that we're not innovators, that we're stuck in the past. I just think about how much this business has changed over the years."

"It can change more, without a doubt, and there is no doubt that the communication capabilities that we have now mean there will be a shortening of the distribution chain," he adds. "That's already happening quite dramatically and in the personal lines market, obviously even more rapidly."

"WE DO A DISSERVICE TO OUR INDUSTRY BY SAYING THAT WE'RE NOT INNOVATORS, THAT WE'RE STUCK IN THE PAST"

— DANE DOUETIL, MINOVA INSURANCE

TOM BOLT, PRESIDENT OF BERKSHIRE HATHAWAY SPECIALTY INSURANCE FOR SOUTHERN EUROPE

STAYING TRUE TO THE COURSE

For seven years, Tom Bolt was director of performance management at Lloyd's of London. Now at Berkshire Hathaway Specialty Insurance, EXPOSURE asks him what it is like to be back on the front line and what it takes to stay there

"A GOOD IDEA IN THE INSURANCE SECTOR CAN TRAVEL AROUND THE INDUSTRY IN A NANOSECOND. AS SOON AS IT IS OUT THERE, OTHER COMPANIES WILL BE QUICK TO FOLLOW"

Few would argue that the insurance industry is not undergoing a period of pronounced change. External influences and internal forces are combining to create an environment full of new risks, ripe for new ideas, and open to new technologies and approaches. However, for Tom Bolt, president of Berkshire Hathaway Specialty Insurance for Southern Europe, no matter how strong these forces are or how many directions they come from, to win out the industry must hold true to the fundamental principles of insurance.

The nature of risk

For Bolt, one of the big challenges that the insurance industry is tackling head-on is the marked change in the nature of risk that has taken place in recent years due to an ever-shrinking and more joined-up world.

"Cyber is a prime example of this increasingly interconnected form of risk," he explains. "Here you are seeing the emergence of significant potential for non-physical damage-related exposures which means that we cannot simply parcel it up the way we would with physical damage. Such exposures require a whole new way of thinking about the nature of risk – and we must adopt that new way of thinking because these are increasingly the risks that our corporate clients want solutions for."

Any suggestion, however, that the insurance industry is unable or too slow to evolve with sufficient speed to meet these new demands is quickly rebuffed. "The ability to change and respond is part of the insurance industry's make-up," he states, "although whether it changes as a result of internal drivers or external forces is another question."

While the rate of change today far outpaces any period in the industry's history, Bolt remains confident the market can keep pace due in particular to its ability to replicate good ideas. "A good idea in the insurance sector can travel around the industry in a nanosecond. As soon as it is out there, other companies will be quick to copy. In my view, while there are not that many first movers in the sector, there are a heck of a lot of really fast second adopters."

"Some companies will of course be left behind by this wave," he continues, "while those who fully engage with the process will find themselves in a much stronger position. You have to look at how you can take advantage of what is in front of you and not be too myopic in your approach."

Focusing our attention

A key factor in how the industry evolves will be where it chooses to invest. One area is data accumulation and management technologies, an area where Bolt believes significant advances have been made and new initiatives undertaken to push boundaries and expand the industry's ability to capitalize on a data-rich environment. However, he questions whether all organizations are making the right investments in their data infrastructures.

"You see a lot of people setting up architectures which are designed to increase the amount of data under management. Yet, I'm not sure you are seeing enough companies putting in place the supporting architecture that you need to translate that data into knowledge that will add real underwriting value."

While the availability of big data is expanding exponentially via a multitude of sources, the challenge is how to put it to best use. "The issue is not so much big data itself, but rather how you make the big data connections. Do companies have the people and systems in place that will enable them

Career highlights

Tom Bolt is president of Berkshire Hathaway Specialty Insurance, Southern Europe. Tom has extensive experience in insurance and reinsurance, spanning the UK, Europe, and the U.S. He was most recently director of performance management at Lloyd's. Prior to that, he was managing director of Marlborough Managing Agency and spent 25 years at the Berkshire Hathaway Group in a variety of senior executive roles, including senior vice president of the Reinsurance Division, and managing director of Tenecom and BHIIL. Tom holds a bachelor's degree and a master's degree from Northwestern University.

to link the data sets and reach meaningful conclusions that will tell them something different about a particular risk?"

Retail lines, he believes, provide the most fertile ground for those able to unlock the data potential. "The use of big data is much more prevalent in areas such as motor than it is in commercial lines because of the number of exposure units you have and the level of data you can accumulate. You have sufficient data at your disposal to generate a statistically credible database for such a book of business."

Telling the story

As advanced analytical techniques, such as machine learning, help better dissect and distil data, this will significantly boost the potential for greater automation which in turn will drive further commoditization of insurance products.

"Over time, any risks that can be commoditized will be commoditized," believes Bolt. "These will be the data-heavy lines of business, where machine learning can make a real difference to our understanding of the risk. But these techniques can't simply be applied to all types of risk. There are many exposures out there that don't conform to 'conventional' risk parameters. That is where the skill of the underwriter will be required."

"WHILE THERE ARE NOT THAT MANY FIRST MOVERS IN THE SECTOR, THERE ARE A HECK OF A LOT OF REALLY FAST SECOND ADOPTERS"

Bolt uses the analogy of the trading floor to illustrate this point. "Let's take Wall Street. There you have guys who trade futures on derivatives such as treasury securities, for example. But you also have those who focus on corporate bond placements. These placements are referred to as 'story paper', because unlike the treasury securities, they require someone to be able to explain the story behind them."

"A lot of the risks that come into the London Market today are what I would describe as 'story paper'. You need someone to be able to tell the story well and someone who can listen to that story and who has the imagination and the acumen to configure a policy based on that story."

Those companies which are not focused on translating these 'non-standard' risks into meaningful cover are probably not long for the insurance world, he believes. "If all you are doing is providing capacity for commoditized risks, then over time there is a very strong likelihood that the financial sector will simply put up commodity capital and pretty much remove the need for the underwriter in that scenario."

Keeping the customer front-and-center

Being able to put down these complex risk stories in a comprehensive and robust insurance policy requires hands-on underwriting expertise as well as the ability to work as closely as possible with the customer. However, while Bolt is confident that that expertise is in plentiful supply in specialist arenas such as London, he is concerned that the industry is not as close to the customer as it should be.

"I worry that the industry has in some ways lost sight of the customer," he says. "We see a lot of companies establishing partnerships with other organizations, consultants or services providers – and such partnerships are important to the robustness of our industry. But we must not forget that our closest partner should be the customer."

"Who is better placed to tell you about the risks they worry about than the customer themselves?" he asks. "In fact, increasingly they are finding their own way to solve many of these problems. What we need to do is work with them to develop solutions for those risks they can't solve. We have the data and the technology to replicate these risks, we just need to create the cover – that is the most effective and straightforward route to success going forward."

"For me, these are the fundamentals of what makes a great insurer," he concludes. "If you can stick to these principles – listen to your customer, structure a product that closely fits their needs and price it appropriately – then over time you will win out, even with the pressure for change that we are witnessing now. Yes, we must respond to these new dynamics, but also we must not forget what we stand for as an industry."

CYBER

THE DAY A BOTNET TOOK DOWN THE INTERNET

The Dyn distributed denial of service (DDoS) attack in October 2016 highlighted security flaws inherent in the Internet of Things (IoT). EXPOSURE asks what this means for businesses and insurers as the world becomes increasingly connected

A decade ago, Internet connections were largely limited to desktop computers, laptops, tablets, and smart phones. Since then there has been an explosion of devices with IP addresses, including baby monitors, connected home appliances, motor vehicles, security cameras, webcams, 'Fitbits' and other wearables. Gartner predicts there will be 20.8 billion things connected to the Internet by 2020.

In a hyper-connected world, governments, corporates, insurers and banks need to better understand the potential for systemic and catastrophic risk arising from a cyber attack seeking to exploit IoT vulnerabilities. With few actual examples of how such attacks could play out, realistic disaster scenarios and cyber modeling are essential tools by which (re)insurers can manage their aggregate exposures and stress test their portfolios.

Many IoT devices currently on the market were not designed with strict IT security in mind. Ethical hackers have demonstrated how everything from cars to children's toys can be compromised. These connected devices are often an organization's weakest link. The cyber criminals responsible for the 2013 Target data breach are understood to have gained access to the retailer's systems and the credit card details of over 40 million customers via the organization's heating, ventilation and air conditioning (HVAC) system.

The assault on DNS hosting firm Dyn in October 2016, which brought down multiple websites including Twitter, Netflix, Amazon, Spotify, Reddit, and CNN in Europe and the U.S., was another wake-up call. The DDoS attack was perpetrated using the Mirai virus to compromise IoT systems. Like a parasite, the malware gained control of an estimated 100,000 devices, using them to bombard and overwhelm Dyn's infrastructure.

This is just the tip of the iceberg, according to Ken Munro, partner, Pen Test Partners. "My first thought [following the Dyn attack] was 'you ain't seen nothing yet'. That particular incident was probably using the top end of a terabyte of data per second, and that's nothing. We've already seen a botnet that is several orders of magnitude larger than that. If malicious actors wanted to, they would attack core services on the Internet and I think we'd be seeing a near global outage."

In the rush to bring new IoT devices to market, IT security has been somewhat of an afterthought, thinks Munro. The situation is starting to change, though, with consumer watchdogs in Norway, the Netherlands and the U.S. taking action. However, there is a significant legacy problem to overcome and it will be several years before current security weaknesses are tackled in a meaningful way.

"I've still got our first baby monitor from 10 years ago," he points out. "The Mirai botnet should have been impossible, but it wasn't because a whole bunch of security camera manufacturers did a really cheap job. IT security wasn't on their radar. They

SCENARIOS ADDED TO RMS CAMS v2.0

CYBER-INDUCED FIRES IN COMMERCIAL OFFICE BUILDINGS

Hackers exploit vulnerabilities in the smart battery management system of a common brand of laptop, sending their lithium-ion batteries into thermal runaway state. The attack is coordinated to occur on one night. A small proportion of infected laptops that are left on charge overnight overheat and catch fire, and some unattended fires in commercial office buildings spread to cause major losses. Insurers face claims for a large numbers of fires in their commercial property and homeowners' portfolios.

CYBER-ENABLED MARINE CARGO THEFT FROM PORT

Cyber criminals gain access to a port management system in use at several major ports. They identify high value cargo shipments and systematically switch and steal containers passing through the ports over many months. When the process of theft is finally discovered, the hackers scramble the data in the system, disabling the ports from operating for several days. Insurers face claims for cargo loss and business interruption in their marine lines.

ICS-TRIGGERED FIRES IN INDUSTRIAL PROCESSING PLANTS

External saboteurs gain access to the process control network of large processing plants, and spoof the thermostats of the industrial control systems (ICS), causing heat-sensitive processes to overheat and ignite flammable materials in storage facilities. Insurers face sizeable claims for fire and explosions in a number of major industrial facilities in their large accounts and facultative portfolio.

PCS-TRIGGERED EXPLOSIONS ON OIL RIGS

A disgruntled employee gains access to a Network Operations Centre (NOC) controlling a field of oil rigs, and manipulates several of the Platform Control Systems (PCS) to cause structural misalignment of well heads, damage to several rigs, oil and gas release, and fires. At least one platform has a catastrophic explosion. Insurers face significant claims to multiple production facilities in their offshore energy book.

REGIONAL POWER OUTAGE FROM CYBER ATTACK ON U.S. POWER GENERATION

A well-resourced cyber team infiltrates malware into the control systems of U.S. power generating companies that creates desynchronization in certain types of generators. Sufficient generators are damaged to cause a cascading regional power outage that is complex to repair. Restoration of power to 90 percent of customers takes two weeks. Insurers face claims in many lines of business, including large commercial accounts, energy, homeowners and speciality lines. The scenario is published as a Lloyd's Emerging Risk Report 'Business Blackout' by Cambridge Centre for Risk Studies and was released in RMS CAMS v1.1.

REGIONAL POWER OUTAGE FROM CYBER ATTACK ON UK POWER DISTRIBUTION

A nation-state plants 'Trojan Horse' rogue hardware in electricity distribution substations, which are activated remotely to curtail power distribution and cause rolling blackouts intermittently over a multi-week campaign. Insurers face claims in many lines of business, including large commercial accounts, energy, homeowners and specialty lines. The scenario is published as 'Integrated Infrastructure' by Cambridge Centre for Risk Studies, and was released in RMS CAMS v1.1.

were thinking about keeping people's homes secure without even considering that the device itself might actually be the problem."

In attempting to understand the future impact of such attacks, it is important to gain a better understanding of motivation. For cyber criminals, DDoS attacks using IoT botnets could be linked to extortion attempts or to diverting the attention of IT professionals away from other activities. For state-sponsored actors, the purpose could be more sinister, with the intent to cause widespread disruption, and potentially physical damage and bodily harm.

Insurers stress-test "silent" cyber

It is the latter scenario that is of growing concern to risk and insurance managers. Lloyd's, for instance, has asked syndicates to create at least three internal "plausible but extreme" cyber attack scenarios as stress-tests for cyber catastrophe losses. It has asked them to calculate their total gross aggregate exposure to each scenario across all classes, including "silent" cyber.

AIG is also considering how a major cyber attack could impact its book of business. "We are looking at it, not only from our own ERM perspective, but also to understand what probable maximum losses there could be as we start to introduce other products and are able to attach cyber to traditional property and casualty policies," explains Mark Camillo, head of cyber at AIG. "We look at different types of scenarios and how they would impact a book."

AIG and a number of Lloyd's insurers have expanded their cyber offerings to include cover for non-damage business interruption and physical damage and bodily harm arising from a cyber incident. Some carriers – including FM Global – are explicitly including cyber in their traditional suite of products. Others have yet to include explicit wording on how traditional products would respond to a cyber incident.

"I don't know if the market will move towards exclusions or including affirmative cyber coverage within property and casualty to give insureds a choice as to how they want to purchase it," states Camillo. "What will change is that there is going to have to be some sort of due diligence to ensure cyber exposures are coded properly and carriers are taking that into consideration in capital requirements for these types of attacks."

In addition to markets such as Lloyd's, there is growing scrutiny from insurance industry regulators, including the Prudential Regulation Authority in the U.K., on how a major cyber event could impact the insurance industry and its capital buffers. They are putting pressure on those carriers that are currently silent on how their traditional products would respond, to make it clear whether cyber-triggered events would be covered under conventional policies.

"The reinsurance market is certainly concerned about, and constantly looking at the potential for, catastrophic events that could happen across a portfolio," says William Henriques, senior managing director and co-head of the Cyber Practice Group at Aon Benfield. "That has not stopped them from writing cyber reinsurance and there's enough capacity out there. But as the market grows and gets to $10 billion, and reinsurers keep supporting that growth, they are going to be watching that accumulation and potential for catastrophic risk and managing that."

"IF MALICIOUS ACTORS WANTED TO, THEY WOULD ATTACK CORE SERVICES ON THE INTERNET AND I THINK WE'D BE SEEING A NEAR GLOBAL OUTAGE"

— KEN MUNRO, PEN TEST PARTNERS

Catastrophic cyber scenarios

In December 2015 and again in December 2016, parts of Ukraine's power grid were taken down. WIRED magazine noted that many parts of the U.S. grid were less secure than Ukraine's and would take longer to reboot. It was eerily similar to a fictitious scenario published by Cambridge University's Centre for Risk Studies in partnership with Lloyd's in 2015. 'Business Blackout' considered the impact of a cyber attack on the US power grid, estimating total economic impact from the 1-in-200 scenario would be $243 billion, rising to $1 trillion in its most extreme form.

It is not beyond the realms of possibility for a Mirai-style virus targeting smart thermostats to be used to achieve such a blackout, thinks Pen Test Partners' Ken Munro. "You could simultaneously turn them all on and off at the same time and create huge power spikes on the electricity grid. If you turn it on and off and on again quickly, you'll knock out the grid – then we would see some really serious consequences."

Smart thermostats could be compromised in other ways, for instance by targeting food and pharmaceutical facilities with the aim to spoil goods. There is a commonly held belief that the industrial and supervisory control and data acquisition systems (ICS/SCADA) used by energy and utility companies are immune to cyber attacks because they are disconnected from the Internet, a protective measure known as "air gapping". Smart thermostats and other connected devices could render that defense obsolete.

"WE'RE RELEASING A NUMBER OF CYBER-PHYSICAL ATTACK SCENARIOS THAT CAUSE LOSSES TO TRADITIONAL PROPERTY INSURANCE"

— ANDREW COBURN, RMS

In its latest Cyber Accumulation Management System (CAMS v2.0), RMS considers how silent cyber exposures could impact accumulation risk in the event of major cyber attacks on operations technology, using the Ukrainian power grid attack as an example. "We're releasing a number of cyber-physical attack scenarios that cause losses to traditional property insurance," explains Andrew Coburn, senior vice president at RMS and a founder and member of the executive team of the Cambridge Centre for Risk Studies.

"We're working with our clients on trying to figure out what level of stress test should be running," he explains. "The CAMS system we've released is about running large numbers of scenarios and we're extending that to look at silent cover, things in conventional insurance policies that could potentially be triggered by a cyber attack, such as fires and explosions."

Multiple lines of business could be impacted by a cyber event thinks Coburn, including nearly all property classes, including aviation and aerospace. "We have just developed some scenarios for marine and cargo insurance, offshore energy lines of business, industrial property, large numbers of general liability and professional lines, and, quite importantly, financial institutions professional indemnity, D&O and specialty lines."

"The IoT is a key element of the systemic potential of cyber attacks," he says. "Most of the systemic risk is about looking at your tail risk. Insurers need to look at how much capital they need to support each line of business, how much reinsurance they need to buy and how they structure their risk capital."

MODELS

A MODEL FUTURE

As market dynamics ramp up the need for smarter ways to gain competitive edge, Mohsen Rahnama, chief risk modeling officer and general manager of models & data, explains how RMS is responding to meet the needs of its clients

Mohsen Rahnama, Ph.D. is chief risk modeling officer and general manager of models & data at RMS

In today's rapidly changing market, innovation and agility drive competitive advantage. RMS has served the global risk and insurance market for over 25 years, and innovation has been our consistent imperative while we supported the market as it defined and implemented robust catastrophe risk management practices. By all measures, the global (re)insurance industry is now more resilient than it has ever been.

Yet the pace of change has never been faster, and never have we been more committed to our clients' success. They need to own their view of risk, which requires us, in turn, to deliver new levels of modeling transparency, configurability and service. Clients need new scientific insights on faster cycles, compelling us to increase our own agility and optimize and scale our development processes. They also want models to close the gap on coverage to enable expansion into emerging markets globally. Our customers need more granular and expressive analytics which allow more data-driven differentiation and more innovative forms of coverage. To support their pursuit of opportunity and new classes of business, such as cyber, they need sound modeling to create new products and facilitate responsible growth.

For our clients, this is a long list of needs. For RMS, it is a mission plan.

And the demands are growing for more efficient data management and modeling to deliver cost-effective insights into the heart of increasingly dynamic and analytics-intensive workflows. In response, we are embracing change ourselves, evolving and adapting to the demands of a rapidly changing market.

Responding to the industry's needs

This is an exciting time at RMS. We have released our first suite of high-definition (HD) models including the RMS® Japan Typhoon HD Model, the RMS Europe Inland Flood HD Models, and the RMS® New Zealand Earthquake HD Model. This Spring (2017), we will release comprehensive updates to the RMS North America Earthquake models and RMS North Atlantic Hurricane models in RiskLink® 17.0, Risk Assessor, Cyber 2.0, as well as several new and upgraded models for Asia. Our teams have worked with great dedication to create the models so they meet the current needs of our clients.

With technology and computing power having advanced significantly since the early days of catastrophe models, we have more capability to address key elements of model and loss uncertainty in a much more systematic way. RMS model assumptions undergo an increasingly stringent process of refinement, where actual events, scientific advances, increased data and technological upgrades combine to enhance implementation, improve responsiveness, heighten granularity and, ultimately, reflect as accurately as possible the potential risk.

Cloud capacity is constantly expanding and supports vastly superior data processing power, which is delivering a level of granularity that extends into the inner workings of the individual policy. This ability to assess data from ground level up is supporting risk assessment at a much higher resolution. And the ability to extend the scientific capability of our models to HD allows a holistic quantification of the risk while addressing the elements of the model and exposure uncertainties. Across multiple regions, perils and business units, the combination of HD models and powerful analytics provides a more dynamic assessment of risk, giving firms more opportunities to differentiate and diversify.

Removing barriers

We see how important transparency is to our clients, and are delivering modeling advances that a more transparent. We work with clients to explore the data, to explain the rationale, and to demonstrate the value we deliver.

Communication is another area we are investing in to facilitate the market's management of risk. Communication between parties across the insurance industry – insurance, brokers, reinsurance, regulatory and capital markets – will be vastly different in the future, especially with regards to data transfer and use of analytics.

Collaborating via a common risk management platform will be needed to manage the efficiency, accurate data collection, and improvements in underwriting workflow processes that will be demanded. It will also enable more robust and informed risk assessments, portfolio rollout processes, and risk transfers. We have also committed considerable investment and resources to model the interconnectedness of risk.

It is this future-gazing that has culminated in the launch of the RMS(one)® platform, which represents a paradigm shift in modeling capabilities by providing the functionality, scalability and flexibility to allow firms to build a fully customizable and integrated view of risk across their whole organization. By strengthening the link between modeled losses and underlying exposures, the RMS(one) platform enables real-time risk reporting of portfolio metrics, and delivers that data to the point of impact – the underwriting front line.

By building an open-source platform, we have evolved our design aesthetic and philosophy to be more client-focused – no longer building 'cathedrals' but rather creating solutions that are much more flexible, responsive and fluid. Our clients no longer simply use our models – instead they play a full and active role in their development, helping to future-proof the process and evolve capabilities at a rate which was not previously possible.

We are excited by the future and remain committed to helping our clients as they evolve into the new market leaders. And as we continue to enhance and develop our platform investment, we will also expand our model development capability, having grown our teams by 20 percent in the last two years to be able to build the new HD models, while maintaining the existing RiskLink products.

OUR CLIENTS NO LONGER SIMPLY USE OUR MODELS, THEY PLAY A FULL AND ACTIVE ROLE IN THEIR DEVELOPMENT, HELPING TO FUTURE-PROOF THE PROCESS AND EVOLVE CAPABILITIES AT A RATE NOT PREVIOUSLY POSSIBLE

THE NORTH AMERICA EARTHQUAKE MODELS IN NUMBERS

360,000

Number of fault sources included in the UCERF3, the USGS California seismic source model

>3,800

Number of unique U.S. vulnerability functions in RMS' 2017 North America Earthquake Models for building shake coverage, with the ability to further differentiate risk based on 21 secondary building characteristics

>30

Size of team at RMS that worked on updating the latest model

QUAKE

AN UNPARALLED VIEW OF EARTHQUAKE RISK

As RMS launches Version 17 of its North America Earthquake Models, EXPOSURE looks at the developments leading to the update and how distilling immense stores of high-resolution seismic data into the industry's most comprehensive earthquake models will empower firms to make better business decisions

The launch of RMS' latest North America Earthquake Models marks a major step forward in the industry's ability to accurately analyze and assess the impacts of these catastrophic events, enabling firms to write risk with greater confidence due to the underpinning of its rigorous science and engineering.

The value of the models to firms seeking new ways to differentiate and diversify their portfolios as well as price risk more accurately, comes from a host of data and scientific updates. These include the incorporation of seismic source data from the U.S. Geological Survey (USGS) 2014 National Seismic Hazard Mapping Project.

"Our goal was to provide clients with a seamless view of seismic hazards across the U.S., Canada and Mexico that encapsulates the latest data and scientific thinking— and we've achieved that and more," explains Renee Lee, head of earthquake model and data product management at RMS.

"There have been multiple developments – research and event-driven – which have significantly enhanced understanding of earthquake hazards. It was therefore critical to factor these into our models to give our clients better precision and improved confidence in their pricing and underwriting decisions, and to meet the regulatory requirements that models must reflect the latest scientific understanding of seismic hazard."

Founded on collaboration

Since the last RMS model update in 2009, the industry has witnessed the two largest seismic-related loss events in history – the New Zealand Canterbury Earthquake Sequence (2010-2011) and the Tohoku Earthquake (2011).

"We worked very closely with the local markets in each of these affected regions," adds Lee, "collaborating with engineers and the scientific community, as well as sifting through billions of dollars of claims data, in an effort not only to understand the seismic behavior of these events, but also their direct impact on the industry itself."

A key learning from this work was the impact of catastrophic liquefaction. "We analyzed billions of dollars of claims data and reports to understand this phenomenon both in terms of the extent and severity of liquefaction and the different modes of failure caused to buildings," says Justin Moresco, senior model product manager at RMS. "That insight enabled us to develop a high-resolution approach to model liquefaction that we have been able to introduce into our new North America Earthquake Models."

An important observation from the Canterbury Earthquake Sequence was the severity of liquefaction which varied over short distances. Two buildings, nearly side-by-side in some cases, experienced significantly different levels of hazard because of shifting geotechnical features. "Our more developed approach to modeling liquefaction captures this variation, but it's just one of the areas where the new models can differentiate risk at a higher resolution," said Moresco. The updated models also do a better job of capturing where soft soils are located, which is essential for predicting the hot spots of amplified earthquake shaking."

"There is no doubt that RMS embeds more scientific data into its models than any other commercial risk modeler," Lee continues. "Throughout this development process, for example, we met regularly with USGS developers, having active discussions about the scientific decisions being made. In fact, our model development lead is on the agency's National Seismic Hazard and Risk Assessment Steering Committee, while two members of our team are authors associated with the NGA-West 2 ground motion prediction equations."

Distilling the data

While data is the foundation of all models, the challenge is to distil it down to its most business-critical form to give it value to clients. "We are dealing with data sets spanning millions of events," explains Lee, "for example, UCERF3 — the USGS California seismic source model — alone incorporates more than 360,000 fault sources. So, you have to condense that immense amount of data in such a way that it remains robust but our clients can run it within 'business hours'."

Since the release of the USGS data in 2014, RMS has had over 30 scientists and engineers working on how to take data generated by a super computer once every five to six years and apply it to a model that enables clients to use it dynamically to support their risk assessment in a systematic way.

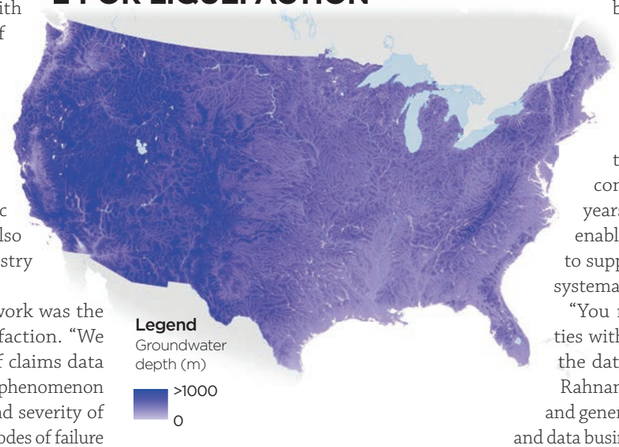
"You need to grasp the complexities within the USGS model and how the data has evolved," says Mohsen Rahnama, chief risk modeling officer and general manager of the RMS models and data business. "In the previous California seismic source model, for example, the USGS used 480 logic tree branches, while this time they use 1,440 logic trees. You can't simply implement the data – you have to understand it. How do these faults interact? How does it impact ground motion attenuation? How can I model the risk systematically?"

As part of this process, RMS maintained regular contact with USGS, keeping them informed of how they were implementing the data and what distillation had taken place to help validate their approach.

Building confidence

Demonstrating its commitment to transparency, RMS also provides clients with access to its scientists and engineers to help them drill down in the changes into the model. Further, it is publishing comprehensive documentation on the methodologies and validation processes that underpin the new version.

FIRST GROUNDWATER MAP FOR LIQUEFACTION



EXPANDING THE FUNCTIONALITY

- Upgraded soil amplification methodology that empowers (re)insurers to enter a new era of high-resolution geotechnical hazard modeling, including the development of a Vs30 (average shear wave velocity in the top 30 meters at site) data layer spanning North America
- Advanced ground motion models leveraging thousands of historical earthquake recordings to accurately predict the attenuation of shaking from source to site
- New functionality enabling high and low representations of vulnerability and ground motion
- 3,800+ unique U.S. vulnerability functions for building shake coverage. Ability to further differentiate risk based on 21 secondary building characteristics
- Latest modeling for very tall buildings (>40 stories) enables more accurate underwriting of high-value assets
- New probabilistic liquefaction model leveraging data from the 2010-2011 Canterbury Earthquake Sequence in New Zealand
- Ability to evaluate secondary perils: tsunami, fire following earthquake and earthquake sprinkler leakage
- New risk calculation functionality based on an event set includes induced seismicity
- Updated basin model for Seattle, Mississippi Embayment, Mexico City and Los Angeles. Added a new basin model for Vancouver
- Latest historical earthquake catalog from the Geological Survey of Canada integrated, plus latest research data on the Mexico Subduction Zone
- Seismic source data from the U.S. Geological Survey (USGS) 2014 National Seismic Hazard Mapping Project incorporated, which includes the third Uniform California Earthquake Rupture Forecast (UCERF3)
- Updated Alaska and Hawaii hazard model, which was not updated by USGS

THE ONE THING

WHAT ONE THING WOULD HELP... CLOSE THE PROTECTION GAP?

In each edition of EXPOSURE, we ask three experts their opinion on how they would tackle a major risk and insurance challenge. This issue, we consider the protection gap, which can be defined as the gap between insured and economic losses in a particular region and/or type of exposure. As our experts John Seo, Kate Stillwell and Evan Glassman note, protection gaps are not just isolated to the developing world or catastrophe classes of business

JOHN SEO

Co-founder and managing principal of Fermat Capital

The protection gap is often created by the terms of the existing insurance itself, and hence, it could be closed by designing new, parametric products. Flood risk is excluded or sub-limited severely in traditional insurance coverage, for instance. So the insurance industry says "we cover flood", but they don't cover it adequately and are heavily guarded in the way they cover it.

A great example in the public domain was in 2015 in the Southern District Court of New York with New York University (NYU) versus FM Global. NYU filed a claim for $1.45 billion in losses from Hurricane Sandy to FM Global and FM Global paid $40 million. FM Global's contention was that it was a flood clause in NYU's coverage that was triggered, and because it was a flood event in essence their coverage was limited to $40 million.

Ostensibly on the surface NYU had $1.85 billion in coverage, but when it came to a flood event they really only had $40 million. So the protection gap is not just because there's absolutely no insurance coverage for these types of perils and risks in these geographies and locations, but because the terms of protection are severely sub-limited. And I would claim that's the case for cyber risk for sure.

The industry is very enthusiastic about its growth, but I can see, 10 to 20 years down the line, with a significant national event on cyber that we might find that we're actually naked on cyber, as NYU discovered with Sandy. You could have a Fortune 50 company in the U.S. thinking they have $1 billion of cyber coverage, and they're going to have an event that threatens their existence... but they'll get a check for $50 million in the post.

Ten to 20 years down the line... we might find that we're actually naked on cyber

KATE STILLWELL

Founder and CEO of Jumpstart Recovery

My absolute fundamental goal is to get twice as many people covered for earthquake in California. That doesn't mean they're going to have the same kind of earthquake insurance product that's available now. What they will have is a product which doesn't fill the whole gap but does achieve the goal of immediate economic stimulus, and that creates a virtuous circle that gets other investment coming in.

I wouldn't have founded Jumpstart if I didn't believe that a lump-sum earthquake-triggered cover for homeowners and renters wouldn't help to build resilience... and building resilience fundamentally means filling the protection gap. I am absolutely motivated to ensure that people who are impacted by natural catastrophes have financial protection and can recover from losses quickly.

And in my mind, if I had to choose only one thing to help close the protection gap, it would be to align the products (and the resources) that are available with human psychology. Human beings are not wired to process and consider low-probability, high-consequence catastrophe events.

But if we can develop resources and financial products that tap into human optimism then potentially we can fill this protection gap. Providing a bit of money to jumpstart the post-earthquake recovery process will help to transform consumer thinking around earthquakes from, 'this is a really bad peril and I don't want to think about it' into, 'it won't be so bad because I will have a little bit of resource to bounce back'.

Developing resources and financial products that tap into human optimism can fill this gap

EVAN GLASSMAN

President and CEO, New Paradigm Underwriters

There's a big disconnect between the insured loss and economic loss when it comes to natural catastrophes such as U.S. windstorm and earthquake. From our perspective, parametric insurance becoming more mainstream and a common and widely-adapted vehicle to work alongside traditional insurance would help to close the protection gap.

The insurance industry overall does a good job of providing an affordable large limit layer of indemnity protection. But the industry is only able to do that, and not go out of business after every event, as a result of attaching after a significant buffer layer of the most likely losses.

Parametric insurance is designed to work in conjunction with traditional insurance to cover that gap. The tranche of deductibles in tier one wind-zones from the Gulf Coast to the Northeast has been estimated at $400 billion by RMS... and that's just the deductible tranche.

The parametric insurance space is growing but it hasn't reached a critical mass yet where it's a mainstream, widely-accepted practice, much like when people buy a property policy, they buy a liability policy and they buy a parametric policy. We're working towards that and once the market gets there the protection gap will become a lot smaller. It's good for society and it's a significant opportunity for the industry as it's a very big, and currently very underserved market.

This model does have the potential to be used in underdeveloped insurance markets. However, I am aware there are certain areas where there are not yet established models that can provide the analytics for reinsurers and capital markets to be able to quantify and charge the appropriate price for the exposure.

Parametric insurance is designed to work with traditional insurance to cover the gap

BIG DATA

THE ANALYTICS-DRIVEN ORGANIZATION

Over the past 15 years, revolutionary technological advances and an explosion of new digital data sources have expanded and reinvented the core disciplines of insurers. Today's advanced analytics for insurance push far beyond the boundaries of traditional actuarial science. The opportunity for the industry to gain transformational agility in analytics is within reach. Particularly if we learn from other sectors to create more analytics-driven organizations and avoid 'DRIP', explains Farhana Alarakhiya, vice president, software products at RMS

Many (re)insurers seeking a competitive edge look to big data and analytics (BD&A) to help address a myriad of challenges such as the soft market, increasing regulatory pressures, and ongoing premium pressures. And yet amidst the buzz of BD&A, we see a lack of big data strategy specifically for evolving pricing, underwriting and risk selection, areas which provide huge potential gains for firms.

While there are many revolutionary technological advances to capture and store big data, organizations are suffering from 'DRIP'– they are data rich but information poor. This is due to the focus being on data capture, management, and structures, at the expense of creating usable insights that can be fed to the people at the point of impact – delivering the right information to the right person at the right time

Other highly regulated industries have found ways to start addressing this, providing us with sound lessons on how to introduce more agility into our own industry using repeatable, scalable analytics.

Learning from other industries

When you look across organizations or industries that have got the BD&A recipe correct, three clear criteria are evident, giving good guidance for insurance executives building their own analytics-driven organizations:

LESSON #1:

Delivering analytics to the point of impact

In the healthcare industry, the concept of the back-office analyst is not that common. The analyst is a frontline worker – the doctor, the nurse practitioner, the social worker, so solutions for healthcare are designed accordingly.

Let's look within our own industry at the complex role of the portfolio manager. This person is responsible for large, diverse sets of portfolios of risk that span multiple regions, perils and lines of business. And the role relies heavily on having visibility across their entire book of business.

Success comes from insights that give them a clear line of sight into the threats and opportunities of their portfolios – without having to rely on a team of technical analysts to get the information. They not only need the metrics and analytics at their disposal to make informed decisions, they also need to be able to interrogate and dive into the data, understand its underlying composition, and run scenarios so they can choose what is the right investment choice.

If for every analysis, they needed a back-office analyst or IT supporter to get a data dump and then spend time configuring it for use, their business agility would be compromised. To truly become an analytics-driven organization, firms need to ensure the analytics solutions they implement provide the *actual* decision-maker with all the necessary insights to make informed decisions in a timely manner.

LESSON #2

Ensuring usability

Usability is not just about the user interface. Big data can be paralyzing. Having access to actionable insights in a format that provides context and underlying assumptions is important. Often, not only does the frontline worker need to manage multiple analytics solutions to get at insights, but even the user persona for these systems is not well defined. At this stage, the analytics must be highly workflow-driven with due consideration given to the veracity of the data to reduce uncertainty.

Consider the analytics tools used by doctors when diagnosing a patient's condition. They input standard information – age, sex, weight, height, ethnicity, address – and the patient's symptoms, and are provided not with a defined prognosis but a set of potential diagnoses accompanied by a probability score and the sources.

Imagine this level of analytical capability provided in real-time at the point of underwriting; a Utopia many in the industry are seeking that has only truly been achieved by a few of the leading insurers.

In this scenario, underwriters would receive a submission and understand exactly the composition of business they were taking on. They could quickly understand the hazards that could affect their exposures, the impact of taking

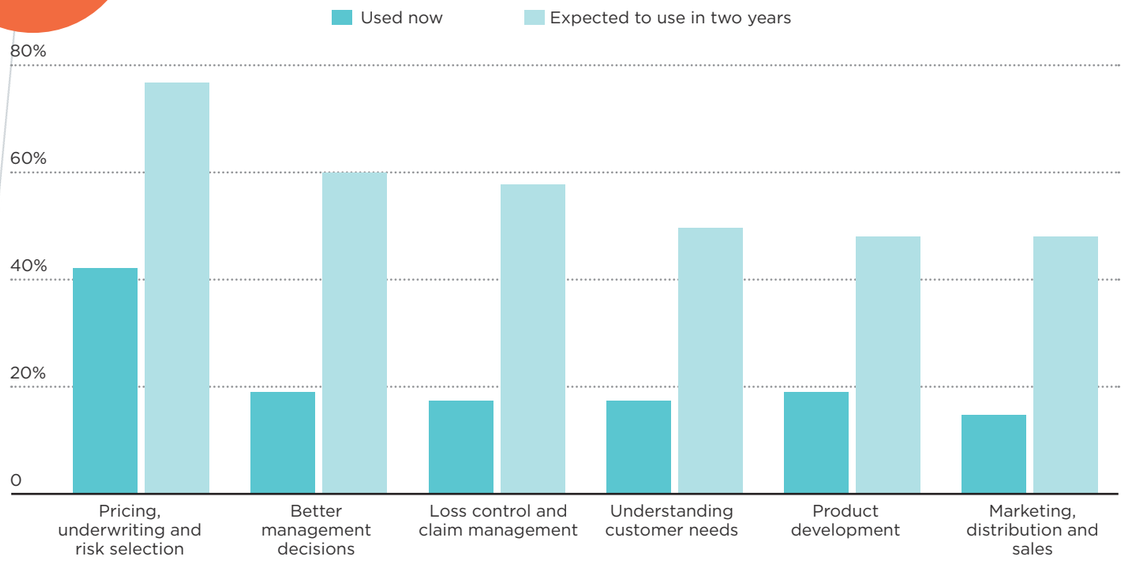
A WILLIS TOWERS WATSON SURVEY REVEALS THAT LESS THAN 45 PER CENT OF U.S. PROPERTY AND CASUALTY INSURANCE EXECUTIVES ARE USING BIG DATA FOR EVOLVING PRICING, UNDERWRITING AND RISK SELECTION. THIS NUMBER IS EXPECTED TO JUMP TO 80 PERCENT IN TWO YEARS' TIME

IMAGINE THIS LEVEL OF ANALYTICAL CAPABILITY PROVIDED IN REAL-TIME AT THE POINT OF UNDERWRITING; A UTOPIA MANY IN THE INDUSTRY ARE SEEKING

Farhana Alarakhiya
is vice president, product marketing of Software at RMS.

HOW WILL INSURERS USE BIG DATA?

Survey of property and casualty insurance executives



Source: Willis Towers Watson

on the business on their capacity – regardless of whether it was a probabilistically – modeled property portfolio, or a marine book that was monitored in a deterministic way.

They could also view multiple submissions and compare them, not only based on how much premium could be bought in by each, but also on how taking on a piece of business could diversify the group-level portfolio. The underwriter not only has access to the right set of analytics, they also have a clear understanding of other options and underlying assumptions.

LESSON #3

Integration into the common workflow

To achieve data nirvana, BD&A output needs to integrate naturally into daily business-as-usual operations. When analytics are embedded directly into the daily workflow, there is a far higher success rate of it being put to effective use.

A good illustration is customer service technology. Historically, customer service agents had to access multiple systems to get information about a caller. Now all their systems are directly integrated into the customer service software – whether it is a customer rating and guidance on how best to handle the customer, or a ranking of latest offers they might have a strong affinity for.

It is the same principle in insurance. It is important to ensure that whatever system your underwriter, portfolio manager, or risk analyst is using, is built and designed with an open architecture. This means it is designed to easily accept inputs from your legacy systems or your specific intellectual property-intensive processes.

Underwriting is an art. And while there are many risks and lines of business that can be automated, in specialty insurance there is a still a need for human-led decision-making. Specialty underwriters combine the deep knowledge of the risks they write, historical loss data, and their own underwriting experience. Having good access to analytics is key to them, and they need it at their fingertips – with little reliance on technical analysts.

SKILLED UNDERWRITERS WANT ACCESS TO ANALYTICS THAT ALLOW THEM TO DERIVE INSIGHTS TO BE PART OF THE DAILY WORKFLOW FOR EVERY RISK THEY WRITE

Skilled underwriters want access to analytics that allow them to derive insights to be part of the daily workflow for every risk they write. Waiting for quarterly board reports to be produced, which tell them how much capacity they have left, or having to wait for another group to run the reports they need, means it is not a business-as-usual process.

TECH TALK: MACHINE LEARNING

A NEW WAY OF LEARNING

EXPOSURE delves into the algorithmic depths of machine learning to better understand the data potential that it offers the insurance industry

"Machine learning is similar to how you teach a child to differentiate between similar animals," explains Peter Hahn, head of predictive analytics at Zurich North America. "Instead of telling them the specific differences, we show them numerous different pictures of the animals, which are clearly tagged, again and again. Over time, they intuitively form a pattern recognition that allows them to tell a tiger from, say, a leopard. You can't predefine a set of rules to categorize every animal, but through pattern recognition you learn what the differences are."

In fact, pattern recognition is already part of how underwriters assess a risk, he continues. "Let's say an underwriter is evaluating a company's commercial auto exposures. Their decision-making process will obviously involve traditional, codified analytical processes, but it will also include sophisticated pattern recognition based on their experiences of similar companies operating in similar fields with similar constraints. They essentially know what this type of risk 'looks like' intuitively."

Tapping the stream

At its core, machine learning is then a mechanism to help us make better sense of data, and to learn from that data on an ongoing basis. Given the data-intrinsic nature of the industry, the potential it affords to support insurance endeavors is considerable.

"MACHINE LEARNING CAN HELP US GREATLY EXPAND THE NUMBER OF EXPLANATORY VARIABLES WE MIGHT INCLUDE TO ADDRESS A PARTICULAR QUESTION" — CHRISTOS MITAS, RMS

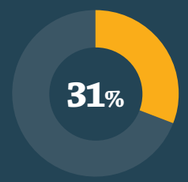
"If you look at models, data is the fuel that powers them all," says Christos Mitas, vice president of model development

MAKING THE INVESTMENT

expect to use AI extensively for underwriting within five years

believe machine learning will deliver huge benefits in accelerating claims assessment and reducing claims leakage

plan to make extensive use of AI for fraud detection within two years, rising to 70 percent within five years



plan to deploy AI-powered avatars within the next 12 months to guide customers through a process, rising to 73 percent within five years

Source: *The Future of General Insurance Report* based on research conducted by Marketforce Business Media and the UK's Chartered Insurance Institute in August and September 2016 involving 843 senior figures from across the UK insurance sector

at RMS. "We are now operating in a world where that data is expanding exponentially, and machine learning is one tool that will help us to harness that."

One area in which Mitas and his team have been looking at machine learning is in the field of cyber risk modeling. "Where it can play an important role here is in helping us tackle the complexity of this risk. Being able to collect and digest more effectively the immense volumes of data which have been harvested from numerous online sources and datasets will yield a significant advantage."

He also sees it having a positive impact from an image processing perspective. "With developments in machine learning, for example, we might be able to introduce new data sources into our processing capabilities and make it a faster and more automated data management process to access images in the aftermath of a disaster. Further, we might be able to apply machine learning algorithms to analyze building damage post event to support speedier loss assessment processes."

"Advances in natural language processing could also help tremendously in claims processing and exposure management," he adds, "where you have to consume reams of reports, images and facts rather than structured data. That is where algorithms can really deliver a different scale of potential solutions."

At the underwriting coalface, Hahn believes a clear area where machine learning can be leveraged is in the assessment and quantification of risks. "In this process, we are looking at thousands of data elements to see which of these will give us a read on the risk quality of the potential insured. Analyzing that data based on manual processes, given the breadth and volume, is extremely difficult."

Looking behind the numbers

Mitas is, however, highly conscious of the need to establish how machine learning fits into the existing insurance eco-system before trying to move too far ahead. "The technology is part of our evolution and offers us a new tool to support our endeavors. However, where our process as risk modelers starts is with a fundamental understanding of the scientific principles which underpin what we do."

"It is true that machine learning can help us greatly expand the number of explanatory variables we might include to address a particular question, for example – but that does not necessarily mean that the answer will more easily emerge. What is more important is to fully grasp the dynamics of the process that led to the generation of the data in the first place."

He continues: "If you look at how a model is constructed, for example, you will have multiple different model components all coupled together in a highly nonlinear, complex system. Unless you understand these underlying structures and how they interconnect, it can be extremely difficult to derive real insight from just observing the resulting data."

Hahn also highlights the potential 'black box' issue that can surround the use of machine learning. "End users of analytics want to know what drove the output," he explains, "and when dealing with algorithms that is not always easy. If, for example, we apply specific machine learning techniques to a particular risk and conclude that it is a poor risk, any experienced underwriter is immediately going to ask how you came to that conclusion. You can't simply say you are confident in your algorithms."

> **"WE NEED TO ENSURE THAT WE CAN EXPLAIN THE RATIONALE BEHIND THE CONCLUSIONS"**
>
> — PETER HAHN, ZURICH NORTH AMERICA

"We need to ensure that we can explain the rationale behind the conclusions that we reach," he continues. "That can be an ongoing challenge with some machine learning techniques."

There is no doubt that machine learning has a part to play in the ongoing evolution of the insurance industry. But as with any evolving technology, how it will be used, where and how extensively will be influenced by a multitude of factors.

"Machine learning has a very broad scope of potential," concludes Hahn, "but of course we will only see this develop over time as people become more comfortable with the techniques and become better at applying the technology to different parts of their business."

WATER SECURITY

MANAGING THE NEXT FINANCIAL SHOCK

EXPOSURE reports on how a pilot project to stress test banks' exposure to drought could hold the key to future economic resilience

There is a growing recognition that environmental stress testing is a crucial instrument to ensure a sustainable financial system. In December 2016, the Task Force on Climate-related Financial Disclosures (TCFD) released its recommendations for effective disclosure of climate-related financial risks.

"This represents an important effort by the private sector to improve transparency around climate-related financial risks and opportunities," said Michael Bloomberg, chair of the TCFD. "Climate change is not only an environmental problem, but a business one as well. We need business leaders to join us to help spread these recommendations across their industries in order to help make markets more efficient and economies more stable, resilient and sustainable."

Why drought?

Drought is a significant potential source of shock to the global financial system. There is a common misconception that sustained lack of water is primarily a problem for agriculture and food production. In Europe alone, it is estimated that around 40 percent of total water extraction is used for industry and energy production (cooling in power plants) and 15 percent for public water supply. The main water consumption sectors are irrigation, utilities and manufacturing.

The macro-economic impact of a prolonged or systemic drought could therefore be severe, and is currently the focus of a joint project between RMS and a number of leading financial institutions and development agencies to stress test lending portfolios to see how they would respond to environmental risk.

"Practically every industry in the world has some reliance on water availability in some shape or form," states Stephen Moss, director, capital markets at RMS. "And, as we've seen, as environmental impacts become more frequent and severe, so there is a growing awareness that water — as a key future resource — is starting to become more acute."

"So the questions are: do we understand how a lack of water could impact specific industries and how that could then flow down the line to all the industrial activities that rely on the availability of water? And then how does that impact on the broader economy?" he continues. "We live in a very interconnected world and as a result, the impact of drought on one industry sector or one geographic region can have a material impact on adjacent industries or regions, regardless of whether they themselves are impacted by that phenomenon or not."

This interconnectivity is at the heart of why a hazard such as drought could become a major systemic threat for the global financial system, explains RMS scientist, Dr. Navin Peiris. "You could have an event or drought occurring in the U.S. and any reduction in production of goods and services could impact global supply chains and draw in other regions due to the fact the world is so interconnected."

The ability to model how drought is likely to impact banks' loan default rates will enable financial institutions to accurately measure and control the risk. By adjusting their own risk management practices there should be a positive knock-on effect that ripples down if banks are motivated to encourage better water conservation behaviors amongst their corporate borrowers, explains Moss.

"The expectation would be that in the same way that an insurance company incorporates the risk of having to payout on a large natural event, a bank should also be incorporating that into their overall risk assessment of a corporate when providing a loan - and

> **"ONLY BY BRINGING TOGETHER MINISTERIAL LEVEL GOVERNMENT OFFICIALS WITH LEADERS IN COMMERCE CAN WE ADDRESS THE WORLD'S BIGGEST ISSUES"**
>
> — DANIEL STANDER, RMS

“THERE IS A GROWING AWARENESS THAT WATER — AS A KEY FUTURE RESOURCE — IS STARTING TO BECOME MORE ACUTE”

— STEPHEN MOSS, RMS

including that incremental element in the pricing,” he says. “And just as insureds are motivated to defend themselves against flood or to put sprinklers in the factories in return for a lower premium, if you could provide financial incentives to borrowers through lower loan costs, businesses would then be encouraged to improve their resilience to water shortage.”

A critical stress test

In May 2016, the Natural Capital Finance Alliance, which is made up of the Global Canopy Programme (GCP) and the United Nations Environment Programme Finance Initiative, teamed up with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH Emerging Markets Dialogue on Finance (EMDF) and several leading financial institutions to launch a project to pilot scenario modeling.

Funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), RMS was appointed to develop a first-of-its-kind drought model. The aim is to help financial institutions and wider economies become more resilient to extreme droughts, as Yannick Motz, head of the emerging markets dialogue on finance, GIZ, explains.

“GIZ has been working with financial institutions and regulators from G20 economies to integrate environmental indicators into lending and investment decisions, product development and risk management. Particularly in the past few years, we have experienced a growing awareness in the financial sector for climate-related risks.”

“The lack of practicable methodologies and tools that adequately quantify, price and assess such risks, however, still impedes financial institutions in fully addressing and integrating them into their decision-making processes,” he continues. “Striving to contribute to filling this gap, GIZ and NCFA initiated this pilot project with the objective to develop an open-source tool that allows banks to assess the potential impact of drought events on the performance of their corporate loan portfolio.”

It is a groundbreaking project between key stakeholders across public and private sectors, according to RMS managing director Daniel Stander. “There are certain things in this world that you can only get done at a Davos level. You need to bring ministerial-level government officials and members of commerce together. It’s only that kind of combination that is going to address the world’s biggest issues. At RMS, experience has taught us that models don’t just solve problems. With the right level of support, they can make markets and change behaviors as well. This initiative is a good example of that.”

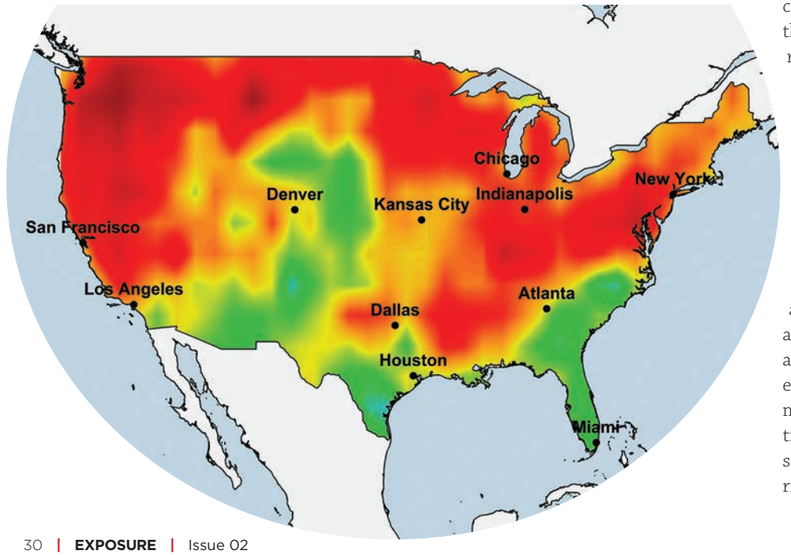
RMS adapted well-established frameworks from the insurance sector to build – in a consortium complemented by the Universities of Cambridge and Oxford – a tool for banks to stress test the impact of drought. The model was built in close collaboration with several financial institutions, including the Industrial and Commercial Bank of China (ICBC), Caixa Econômica Federal, Itaú and Santander in Brazil, Banorte, Banamex and Trust Funds for Rural Development (FIRA) in Mexico, UBS in Switzerland and Citigroup in the US.

“Some of the largest losses we saw in some of our scenarios were not necessarily as a result of an industry sector not having access to water, but because other industry sectors didn’t have access to water, so demand dropped significantly and those companies were therefore not able to sell their wares. This was particularly true for petrochemical businesses that are heavily reliant on the health of the broader economy,” explains Moss. “So, this model is a broad framework that incorporates domestic interconnectivity and trade, as well as global macroeconomic effects.”

There is significant scope to apply this approach to modeling other major threats and potential sources of global economic shock, including natural, manmade and emerging perils. “The know-how we’ve applied on this project can be used to evaluate the potential impacts of other stresses,” explains Peiris. “Drought is just one environmental risk facing the financial services industry. This approach can be replicated to measure the potential impact of other systemic risks on macro and micro economic scales.”

THE DUSTBOWL

The first distinct drought (1930 – 1931) in the ‘dust bowl’ years affected much of the north east and western U.S.



IN CASE YOU MISSED IT

RMS sits at the intersection of technology, science and domain experience giving us a unique perspective on what’s going on in the world of tech, modeling and computing. ‘In Case You Missed It’ is our round-up of the latest developments from Silicon Valley to Bangalore that EXPOSURE doesn’t want its readers to miss. In this edition, Eric Yau, general manager of software at RMS, picks his top three headlines.

01. MITSUI TEAMS UP WITH NASA

In an excellent example of how big data can be utilized to help close the protection gap, Mitsui Sumitomo Insurance has joined forces with NASA. The Japanese insurer is making use of NASA’s satellite data to boost the global potential of weather derivatives and other parametric weather-related insurance products.

Mitsui Sumitomo aims to sell this product globally, having developed an underwriting system that uses remote sensing data from satellites and weather derivatives underpinning the transaction, backed by reinsurance capital.

The product is aimed at all industries that may suffer from a loss of income as a result of extreme or unexpected weather. This includes manufacturers whose output could be suspended by storms or floods, power utilities hit by cold weather during the summer months and even event organizers. Payouts will be made based on previously-agreed-upon conditions regarding temperatures, rainfall and other weather-related factors.

02. RISK MODELER 1.0 – A NEW ERA

Risk Modeler 1.0 marks a step-change for businesses using catastrophe risk models that will transform the modeling paradigm. Powered by RMS(one)®, our open, big data and analytics platform, the analytics solution introduces new and more powerful modeling functionality to surface much deeper insights into the drivers of catastrophe risk.

We have developed Risk Modeler to re-engineer modeling workflows by consolidating and enhancing the analytical devices used by risk analysts. The value gained is more accurate modeling of complex contract and programs, while enabling deeper and more flexible risk interrogation using Risk Modeler’s specialist diagnostic tools and big data querying capabilities.

Leveraging the scale of the Cloud and the power of the RMS(one) platform, which has been purpose-built for the insurance industry, we designed Risk Modeler to act as a single system to support all models, view of risks, and analytics, as well as process larger data volumes than historically possible, while reducing the number of systems our clients have to support in their modeling ecosystems today.

BIG NUMBERS

$187.3 BILLION

Total expected IT insurance spend in 2016

$204 BILLION

Total expected spend on global cloud services in 2016

3.1%

Compound annual growth rate of IT insurance spend through 2020

SOURCE: GARTNER

03. CLOUD COMPUTING & INSURANCE: BUSTING THE MYTHS

In his latest blog, Accenture senior managing director and insurance lead for Europe, Africa and Latin America, Daniele Presutti seeks to address some of the common misconceptions about the adoption of cloud services amongst insurance and reinsurance companies.

Around 85 percent of respondents to Accenture’s 2016 Technology Vision for Insurance survey agreed the cloud would foster innovation in their businesses that was not previously possible. However, only 49 percent were investing in comprehensive digital technology programs as part of their business strategies – moves essential to capitalize on the potential of the cloud.

Some of the reasons (re)insurers are reluctant to move core services to the cloud, include the belief that:

- Lifting and shifting applications to the cloud does not work;
- Sunk costs are unrecoverable, and
- Digital transformation can happen without cloud.

“These beliefs are, for the most part, fallacies,” states Presutti. “In addition to cost savings, moving to a more agile, cloud-based environment provides insurers with the flexibility and speed-to-market that traditional infrastructure cannot match.”

RMS® solutions help insurers, financial markets, corporations, and public agencies evaluate and manage risks throughout the world, promoting resilient societies and a sustainable global economy.

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