Risk
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The Perils and Prospects of Predictive Analytics

By Mark Griffin

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Publication Schedule
Publication Month: February 2019

Chairperson's Corner

By Mario DiCaro

The Joint Risk Management Section was established in 2006. It is a joint venture between the CIA, CAS and SOA and requires many volunteers. I love volunteer work both in the CAS and my community. I did some research to see if other people had similar experiences as I have had when volunteering their time. The short answer is yes, so I can mostly base my remaining comments from my own experience.

Here are some reasons I've hesitated to volunteer:

- I felt unqualified
- My motives weren't pure
- Some aversion to the people I'd be working with
- Didn't have time

Volunteer work is the *best* place to be underqualified. Why? Because you aren't getting paid! The worst that will happen is you ease up on your efforts and somebody else steps up to help or take over. Or you ask for help and some experienced person shows you the ropes. You won't usually get put on a volunteer job that requires skills you don't have or can't learn.

I sometimes join projects hoping my involvement will be good for me professionally or personally without really caring about the project itself. For example, in college I joined a few service activities because I wanted to spend more time with girls I was interested in. Guess what I learned in my research? That's normal, your help will be valued anyway, and you may end up getting what you're after! Even if you don't get any money, you might feel like you did. The London School of Economics determined that volunteering weekly is correlated with a rise in happiness equivalent to having your annual income rise from $20k to a range of $75k–100k.[1]

What about the people? I've made new friends on every volunteer job I've ever been a part of. Working together is bonding.

Research shows volunteering is correlated to career advancement. It may have something to do with the people you meet and the people skills you learn.

There is an old saying "If you want something done, ask a busy person to do it." If you are *not* busy, then you have some time to volunteer. If you *are* busy then you will find a way. Volunteering is worth the effort, you can make time.

If you are reading this I'd guess you already volunteer in your actuarial organization and community. If so, please share this article with your colleagues who may be new to the actuarial profession and are not yet volunteering.

There are a lot of opportunities to get involved. There are people-focused projects on diversity, math-focused projects on curve fitting, environmental-focused projects on climate change. I'm saying there is something for everyone, so get involved a bit and have fun!

Follow these links to find out more about volunteering with your actuarial organization:

https://www.casact.org/community/

http://www.cia-ica.ca/professional-development/volunteering

https://engage.soa.org/volunteeropportunities

Feel free to contact me or one of the individuals below to start getting involved:

David Core, *dcore@casact.org*

Joseph Gabriel, *joseph.gabriel@cia-ica.ca*

David Schraub, *dschraub@soa.org* ◾

Mario DiCaro, FCAS, CERA, MAAA, is VP, capital modeling and analytics at Tokio Marine HCC. He can be reached at *mdicaro@tmhcc.com*.

ENDNOTE

1 *https://www.helpguide.org/articles/healthy-living/volunteering-and-its-surprising-benefits.htm*

Editor's Note

By Cheryl Baoyan Liu

When this last issue of 2018 *Risk Management* reaches you, it's holiday season already. I wish you very merry holidays and a prosperous new year!

Last week, I read an essay telling the remarkable story about Jeff Bezos (pronounced Bay-Zose). Bezos oversaw the extraordinary creation of Amazon and has led the innovations at the company for more than two decades. The innovations have not only changed the buying habits of many but also the way that people do things throughout the world.

Similarly, technology evolutions also change the way insurers manage their businesses. In the March and August issues, we shared articles with readers about the top concerns on technology disruption on insurance business processes and the associated cyber landscape. In this last issue of *Risk Management* in 2018, we examine how innovation is bolstered by risk management.

The feature article is "The Perils and Prospects of Predictive Analytics" by Mark Griffin. Many life and health insurers are beginning to use predictive analytics for a variety of purposes. This article addresses the unique challenges and potential disruption predictive analytics brings to the risk manager, as well as the opportunities. In addition to the many considerations listed in the article, one key suggestion is to periodically assess the company's use of advanced analytics relative to their competitors.

The SOA held several seminars and meetings with the focus on predictive analytics in North America and Asia in 2018. One interesting topic in particular is how InsurTech interacts with risk management through predictive analytics. The seminar in Hong Kong successfully developed and nurtured an in-depth discussion and wide perspectives on this topic. We're honored to have Questor Ng from the organizing committee to share remarks on the seminar in this issue. The seminar provided a good forum for productive and insightful discussion among the audiences who will bring the knowledge back and use it as building blocks in shaping the future predictive analytics development.

We're pleased to have John Rhodes, CRO of Athene, one of the fastest growing and innovative companies in the retirement space, be the guest of the conversation in the third installment of the "Conversation with a CRO" feature series. John shares his experience and views on effective risk management framework. He also comments on the biggest risk issues facing the insurance industry, where "impact of technology" once again is on the top of the list. After the financial crisis, I had the opportunity to work with John at Lincoln Financial when he headed up Lincoln's hedging program. John is certainly a tremendous leader, and I couldn't agree more about what he mentioned in the conversation on his ability to identify patterns, think about patterns and solve the puzzle in business problems.

The Joint Risk Management Research Committee released a new report on enterprise risk management (ERM) stakeholder engagement. This report examines current practices and identifies challenges in achieving ERM stakeholder buy-in. It also offers strategies to help overcome these challenges and improve ERM stakeholder engagement. For an easy reference, the author Kailan Shang provides an article to summarize key points of the research paper "Effective ERM Stakeholder Engagement."

As usual, a list of recent articles and papers is provided that may be of interest to our members. These pieces can provide further information on a broad range of topics.

I would like to give a special thank you to David Schraub and Kathryn Baker for helping me pull together this December issue. As we're gratefully sending out this 2018 *Risk Management* newsletter to you, we are already at work on the first issue of 2019!

Happy Holidays and enjoy reading! ■

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LIVING *to* 100

SOCIETY OF ACTUARIES
INTERNATIONAL SYMPOSIUM

Jan. 13–15, 2020
Orlando, Florida

Save the Date

Mark your calendars for the 2020 Living to 100 Symposium. From Jan. 13–15, 2020 in Orlando, Florida, expert presenters will explore the latest longevity trends, share research results and discuss implications of a growing senior population. This prestigious event brings together thought leaders from around the world to share ideas and knowledge on increasing lifespans. Registration and conference details will be available in summer 2019.
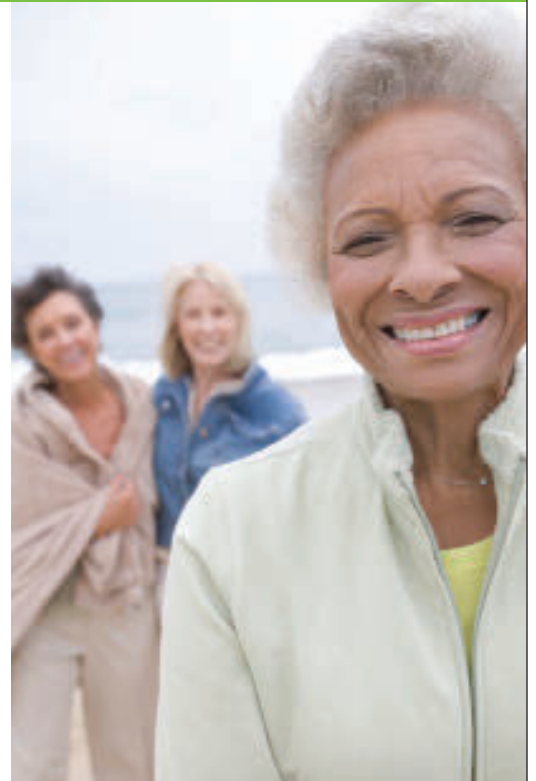
Participating Organizations

The following organizations have agreed to participate in this research endeavor with the Society of Actuaries as of Aug. 2018. To view the current list, visit *Livingto100.SOA.org*.

Actuarial Society of South Africa

Actuaries Institute Australia

American Academy of Actuaries

Canadian Institute of Actuaries

Conference of Consulting Actuaries

Employee Benefit Research Institute

International Longevity Centre - UK

Office of the Chief Actuary, Canada (within the Office of the Superintendent of Financial Institutions)

Pension Research Council and Boettner Center for Pensions and Retirement Research of the Wharton School

The Actuarial Society of Hong Kong

Investments and Wealth Institute

American Geriatric Society

International Actuarial Association

LOMA

LIMRA

Government Actuary's Department (UK)

The Institute of Actuaries of Japan

Women's Institute for a Secure Retirement (WISER)

Institute and Faculty of Actuaries

Visit *LivingTo100.SOA.org* for more information

Staff Corner

By David Schraub

I was first drafting this Staff Corner a few days after the Casualty Actuarial Society and Society of Actuaries announced they were exploring a combination into one new professional organization. The Joint Risk Management Section is the poster child of a combination where the CAS and the SOA, along with our Northern friends at the CIA, are working together successfully. We have been together since 2006 and, far away from the limelight, we have been cranking out great content for our members.

I learned the combination will not go forward as I am proofing the newsletter. Regardless, the JRMS will continue to work together for the common good on risk management.

The ERM Symposium alone delivers close to 15 hours of continuing professional development of content year after year. The content of the sessions is a good example of our cross-practice approach with sessions are not specific to any line of business (e.g., governance, stress test, or operational risk), and some deeper sessions tailored for Life/Health or P&C-GI actuaries. This meeting is led by a volunteer from the CAS with main staff support provided by the CAS for two years, then by a volunteer from the SOA with main staff support provided by the SOA for the following two years.

Another example of our collaborative work is on the research front: The recently published Country Risk Officer report was funded by the JRMS, CIA, and SOA and makes one think about the big picture: What is important? What are the risks faced by a country? How do you measure and monitor the risks? We pioneer an e-book library with more than a hundred titles, which is a great benefit for our members.

We have a 12 member section council composed of CAS, CIA and SOA credentialed individuals, elected and ready to serve all actuaries. The chairmanship rotates between CAS, CIA and SOA.

As we have much to deliver, the JRMS decided to move the frequency of this newsletter to four issues per year in 2019.

Regardless what the future holds, the JRMS will continue to work across practice areas to deliver quality content to risk manager practitioners. ■

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The Perils and Prospects of Predictive Analytics

By Mark Griffin

Many life and health insurers are beginning to use Predictive Analytics (PA) for a variety of purposes. This article addresses the unique challenges and potential disruption PA brings to the risk manager, as well as the opportunities.

First the high-level challenges:

- Typically, PA models are built by a recently hired group of data scientists. While data scientists tend to be very analytically adept, they may have little understanding of the insurance business and little understanding of model governance protocols and techniques within a financial institution.

- PA models are often built using open source code. It will be easy and tempting for model builders to import blocks of code from libraries or other sources to do specific tasks. There should be specified protocol on this topic.

- Insurance risk managers typically have familiarity, if not hands-on experience, with traditional insurance asset, liability and finance models. With respect to PA models, risk managers are less likely to have hands on experience or any level of familiarity. In fact, there may not be anyone within the company (apart from those who built the models) who can peer review or challenge the models. There may be a fairly limited number of people even outside the company who can do this effectively.

Additionally, one must not forget the standard risk management concerns for any large systems development project. For example, project management and data security should be in place, the pros and cons of using the cloud should be considered, etc.

Risk managers must first recognize that Predictive Analytics is a very dynamic field. Kaggle is a very popular platform for PA competitions, bringing parties with problems and data together with willing data scientists. A number of insurance companies have sponsored projects on Kaggle. Last December, the SOA released case studies from their Kaggle Involvement Program.[1] So familiarizing oneself with Kaggle is an easily accessible first step. Also,

Google recently announced they will offer a service to share their expertise in machine learning and Artificial Intelligence.

Other specific considerations and suggestions include:

With respect to data:

- What were the sources of data? Have the legal and compliance teams been involved? Have the sources and uses of the data been properly documented? How will the use of the data be controlled?

- How were any data quality issues or missing data issues addressed? How were perceived outliers treated? Were they deleted or changed? Was this documented? Will this "cleansed" data be used for other purposes within the company for which the treatment of outliers may not be appropriate? ASOP 23 on Data Quality may be helpful.

With respect to the model:

- The risk manager should have knowledge of the high-level decisions and modelling choices. Was a General Linear Model (GLM), or a machine-learning approach used? With GLM, the modelling process often starts with a hypothesis. Typically a target variable is established. These are both steps the risk manager will want to understand. If a lot of data is available, the model builders may try to determine a smaller set of effective "features," which are combinations of variables that appear to influence the target variable. Machine-learning approaches allow the computer to search for dependencies within the data with much less human interface. While this approach may be more effective in finding relationships that weren't previously recognized or properly understood, (and therefore be more "independent" of current approaches and thinking) the approach may be drawn to relationships that have less data supporting them.

- Many PA techniques amount to using computing power to test if the model's result is stable when different subsets of data are used. To do this, the data are typically split into three groups, training, validation, and test data, often in the proportions 70 percent, 20 percent and 10 percent. There may not be enough data to afford this luxury. Any temporal dimension to the data will also limit this process. Actuaries may want to consider tests of statistical significance as another perspective on this same issue. The article "Is Credibility Still Credible?" in the August 2017 issue of *Risk Management* can provide a perspective on this.

- Regardless of the method selected, were all of the relevant subject matter experts involved?

- There is a long list of model governance considerations. Is version control done automatically by the software, or does it rely on developers? Is there a style guide for coding and documentation? Will there be an "audit trail" produced?

- Can the model be explained to users? To management? Do users understand the purpose and results, and will they use the model appropriately, recognizing its limitations?

- How will the impact and success of the model be measured? Some may want to measure the speed of the model, some may want to measure the number of times it is used, some may want to measure the change in financial results.

PA modelling provides the opportunity for significant disruption of traditional approaches. A good example is in the area of streamlined underwriting for term insurance. Companies have sought to provide an easier, faster process for the purchase of term insurance. Removing the collection of fluids from the underwriting process is the fastest way to do that. PA modelling is therefore being used to build underwriting models using both data sources other than body fluids that have historically been collected, in addition to other data sources that may have predictive power with respect to mortality. These new data resources might include credit scores, pharmacy records, etc. The resulting models are then tested against historical records to see how well they reproduce the results of classic underwriting processes that included the collection of fluids.

> Like any disruptive force, it can be very advantageous for companies who adopt [Predictive Analytics] early and effectively, but very detrimental to those who are left behind.

It is worth taking the time to envision the evolution that could follow. As different companies change their underwriting to utilize, or even just reweight, old and new data sources, agent and customer behavior would also change, redistributing business. Eventually, those companies maintaining a traditional approach may lose most or all of their market share to—and even ultimately be selected against—companies using better risk selection in new models.

Many insurers have focused their PA efforts in the marketing area, trying to get ahead in the disruption which is well underway. At a minimum, traditional marketing and sales channels and approaches can be made more efficient.

In the P&C industry, where the use of PA has been prevalent for decades, the underwriting process has been transformed into one where in many cases there are no underwriting classes at all, just a unique price for each customer. In areas like term insurance—where the feedback loop between underwriting and results is slower—the evolution may be slower but would naturally move in the same direction.

In addition to these challenges, there are opportunities related to PA from the risk manager's perspective. A couple of examples are:

1. PA techniques allow a deeper understanding of dependencies between variables, particularly some that don't meet the naked eye. What better tool to help the risk manager design early warning triggers or Key Risk Indicators?

2. Insurance companies have begun to appreciate the value of data. For example, in the earlier example of building streamlined underwriting models, not only are new data sources purchased, but older underwriting records may finally be digitized to provide more data points on the ability of the model to reproduce historical underwriting. With digital underwriting information, the effectiveness of the historic model can be properly evaluated and undoubtedly improved.

The advanced analytics teams (referred to at the beginning of the article) may be part of the risk team. Whether they are or not, their success is in the best interest of the risk management effort, and a close working relationship is essential. Diversity of thought and approach is always the risk manager's friend!

The emergence and evolution of PA approaches will destabilize the marketing, underwriting, and undoubtedly many other aspects of the current life and health insurance environment. Like any disruptive force, it can be very advantageous for companies who adopt early and effectively, but very detrimental to those who are left behind. In addition to the many considerations listed in this article, it would seem wise for risk managers to periodically assess their company's use of advanced analytics relative to their competitors. ■

Mark Griffin, FSA, CERA, is senior managing director and CRO financial risk at TIAA. He can be reached at *mark.griffin@tiaa.org*.

ENDNOTE

1 *https://www.soa.org/predictive-analytics/kaggle-program/*

A New Era for Risk Management: Collaboration Across Businesses Using Predictive Analytics

Remarks on the SOA Predictive Analytics Seminar in Hong Kong

By Questor Ng

The application of predictive analytics in the Asia-Pacific region has recently been gaining momentum and is expected to expand substantially in the coming years. Rising awareness and the use of predictive analytics attribute to the heightened emphasis on enhanced customer service, which edges out competition in order to drive productivity improvement and revenue growth.

A series of SOA predictive analytics seminars were held from Aug. 27–31, 2018 in Hong Kong, Taiwan, and Malaysia. The seminar in Hong Kong focused on how risk management copes with the development of predictive analytics. It was a full day event in which a number of actuarial and risk professionals from Asia and North America participated. Several international experts presented their work and shared their views with others. With keen interaction between the speakers and audience, the seminar successfully developed and nurtured an in-depth discussion and wide perspectives on the topic of predictive analysis.

The two main areas of focus in the Hong Kong seminar were:

1. Views from regulators, insurers and consultants on the increasing desires to leverage data analytics to transform the business behavior of the insurance industry; and

2. The compatibility between innovation and risk management—how predictive analytics advance and are fueled by risk management.

VIEWS FROM REGULATORS, INSURERS, AND CONSULTANTS: WHERE INNOVATION MEETS REGULATION

Technology is a key driver for the future growth of insurance industries. According to a survey by Willis Towers Watson,[1] the overall transaction volume of InsurTech M&As in Asia rose up to US$460 million in 2017. So far, InsurTech development has focused on capabilities related to digital distribution, consumer models and data analytics. At the same time, claim management and processing applications have also become top business priorities.

It is difficult to predict whether those new initiatives, financial products, services and delivery models, can fulfill supervisory requirements. To assist the industry, regulators have to respond quickly to the rapid changes in financial technology development. For example, in 2017, Hong Kong's Insurance Authority launched two flagship programs: Sandbox and Fast Track. This provides a more flexible environment for insurers to test InsurTech initiatives. Of course, such an environment is still under certain regulatory supervision to ensure that relevant supervisory requirements are met.

> So far, InsurTech development has focused on capabilities related to digital distribution, consumer models and data analytics.

With advances in technology, more and more customers can engage, not only in the traditional way, but also through various convenient innovative digital access options. Unconventional products could be designed to meet previously unmet customer needs. As a result, consumers now have access to better processes, products and services.

Regulators needs to maintain a balance between consumer protection and market development.

COMPATIBILITY BETWEEN INNOVATION AND RISK MANAGEMENT

Innovation derived from predictive analytics conjures up images of disruption—breaking through and reaching new heights. The emergence of predictive analytics approaches destabilizes the current marketing, underwriting and many other aspects

of modern insurance practices. The evolution is generally perceived as incompatible with risk management, which focuses on reducing or transferring risk, primarily by imposing controls to keep things in order. In fact, evolving risk management programs focus not only on the identification, measurement, mitigation, monitoring, and communication of risk, but also on capitalizing on risk opportunities to strengthen the innovation process.[2]

Insurance risk process

Constant changes in insurance risk process and the advance of technology led insurers to adapt and change their business practice, such as Business to Customer (BtoC) offerings, personalized offerings, and ease of transactions. Examples include: activity trackers provided to policyholders to monitor their health metrics and telematics which are widely used in auto insurance to keep track of driving habits; as well as the artificial intelligence used to assesses the policyholders' daily behavior and predict insurance risks on a real-time basis help the insurer to develop suitable and affordable products. At the same time, the information obtained can be analyzed for enhanced simplified underwriting and effective claim prediction.

Fraud detection

Advanced analytics enable insurers to analyze the habits and behavior of policyholders to provide better services and enhance underwriting. Data analytics also offer major assistance to insurance fraud prevention. Traditionally, insurance companies use statistical models to identify fraudulent claims, but handling

fraud manually, however, is very costly. Under the big data trend, predictive analytics provide some key benefits in fraud detection, such as:

1. Integrating data and information to identify low-incidence events through sampling techniques, text mining, sentiment analysis, social network analysis, etc.

2. Providing industry-wide solutions through a centralized insurance claims database that employs advanced analytics to examine the claims data collected and enable the industry to detect patterns of fraudulent insurance claims and take early preventive measures when appropriate.

Risk reporting

Risk reports are used to communicate with stakeholders, identify areas for further investigation and generate ideas on why things have unfolded as they have. These results can be sent to predictive modeling for theories testing, creating a desired level of confidence in the answer, and investigating what drives risk events. The results then can be reported back for communication to support business decisions.

LOOK INTO THE FUTURE

As we can see, use of predictive analytics adds value to every stage of the risk management cycle. It can identify anomalies through collected datasets and predict exposure on evolving business environments, generating business insights and risk mitigation strategies.

However, insurers still face the challenge of demonstrating their financial success to justify the significant efforts and resources needed to build the model and test the initiatives.

Overall, the seminar in Hong Kong provided a good forum for productive and insightful discussion among the audiences who could bring the knowledge back and apply it as building blocks in shaping the future predictive analytics development in Asia and globally. ■

Questor Ng, FSA, is chair of the Organizing Committee for the SOA Predictive Analytics Seminar, Hong Kong. Questor is chief risk officer at FWD Life Insurance Company in Hong Kong. He can be reached at *Questor.ng@fwd.com*.

ENDNOTES

1. Willis Towers Watson InsurTech Briefing Q4 2017 report.

2. Aaron M. Halpert, Innovation Fueled by Risk Management, Casualty Actuarial Society E-Forum, Summer 2016.

Conversation with a CRO

An Interview with John Rhodes

John Rhodes, CRO of Athene Holding, Ltd

For this edition of *Risk Management*, we were honored to have the opportunity to interview one of the insurance industry's most well-known and respected executives, John Rhodes, CRO of Athene, one of the fastest growing and innovative companies in the retirement space. John's incredibly diverse background, including leadership roles in the U.S. Navy and investment banking, gives him a unique perspective on the insurance industry, and as we expected made for a fascinating interview.

John was interviewed over the phone on Aug. 17, 2018 by Tony Dardis of Milliman Inc.

John Rhodes is executive vice president and chief risk officer of Athene Holding, Ltd, a leading retirement services company that issues, reinsures and acquires retirement savings products. Athene has grown tremendously in recent years and is known for its superior and unique investment capabilities through its strategic relationship with Apollo Global Management. In particular, Athene has found success in being able to generate exceptional yield pick-up on long-dated liabilities, made possible by combining highly specialized expertise in nuanced asset categories with world-class credit and liquidity risk management. This is something that many insurers have struggled to achieve within the current investment environment. With Athene's corporate headquarters in Bermuda, U.S. headquarters in West Des Moines, Iowa, an office in New York, and the asset management function in Los Angeles, John invariably spends considerable time on the road.

Prior to joining Athene, John held CRO positions at Allstate and Lincoln. Positions prior to that included head of hedging operations and performance management at ING U.S. Financial Services, and risk management roles at JP Morgan Chase and GE Capital. And if that wasn't enough of a diverse background, John started his career as a commissioned officer in the U.S. Navy—something we explored in our interview as giving John a very unique foundation for his career in insurance risk management.

Q: Please tell us about your career in risk management and your path to where you are today.

It has been an interesting path for sure. While it has been a diverse path, I think when looked at overall, it all fits together quite nicely. First off, after graduating from the U.S. Naval Academy, I spent six years as a commissioned officer, having obtained my undergraduate degree in Oceanography. My responsibility was to supervise the operation of Nuclear Power Plants—that of course had a huge risk management aspect to it. But equally important was the leadership side of this position. I started off, straight from college, with 35 people reporting to me and that grew to 100 people in the department by the time I left. At the time I didn't think a lot of this, I was just getting on with my job, but little was I to know that my Navy experience was giving me an incredible foundation for the risk management and leadership roles I would take on later in my career.

My first job out of the Navy was as a residual risk analyst at GE Capital. GE Capital was a large equipment leaser, and my focus was in managing the risks around that. A lot of what I had learned in the Navy was how to think about a problem, how it all fits together, and to look for patterns. This skill was further refined while at GE.

A couple of years after starting at GE, I was hired by JP Morgan Chase as head of their Residual Risk function, which I did for three years. This was in the early 2000s and many banks faced big residual losses at that time. Then in 2004, I switched to the investment banking side of JP Morgan Chase, specializing in valuation and market risk, which included working in the derivatives markets. Around the same time I also got my MBA at NYU. I wasn't necessarily the expert, but I had a broad-based

knowledge of derivatives, which again became a great foundation for work I was to do later in my career.

In 2006 I was looking to get off the investment banking treadmill and made the big switch into insurance when I accepted an offer from ING U.S. to run their hedging operations. I ran that for a couple of years, during the economic crisis, so another unique experience. This was followed in 2009 by a move to head up Lincoln's hedging program, and then in 2012 I was promoted to CRO. In 2015, I started as CRO of Allstate and then moved to Athene in the summer of 2016.

Bringing this all together, I think the basic core skill set this has given me, as I've already hinted at, is the ability to think about patterns in business problems. This has helped immensely in being able to break things down into their component parts, which is so essential in being able to size up risks and prioritize them. And I think having started in non-insurance has been very helpful in that regard. I've been able to identify patterns that help me think about risks more broadly, not simply focused on insurance.

Q: Your comments on leadership are very interesting. Can you say a little more about how your unique background has helped develop your leadership skills?

I've certainly had some significant leadership roles during my career, including now three CRO positions. But even at the age of just 21, I was offered an immediate leadership opportunity in a technical space. It is rare that anyone has an opportunity where their first job is running a team of 35 people. That position framed my views of what works, from a management perspective, early on. Most people will have to wait 10 years or more to get any leadership experience. Today, I am 46 and have spent the last 19 years in the corporate space. To this point in my career, I have always been the youngest at the table when the management team gets together.

Q: What would you view as today's biggest issues facing the insurance industry overall, and also facing your company specifically. How are these issues being addressed?

From an industry perspective, there are indeed many big issues and opportunities, but I will highlight four topics, in particular:

- The impact of technology,

- Changes on the regulatory and political fronts,

- Dangers associated with complacency around "protected" markets, and

- Big Data.

So as far as the impact of technology is concerned, the key is to be able to leverage the value of this and anticipate the competition it could bring in the future. Cyber risk is, of course, very much a focus for the industry, and for Athene.

Most insurance companies have a "technology debt" they are trying to repay. This is to say there is a need to balance the investment in customer service and claims efficiency versus the need to maintain a bottom line. And then how do we think about future competition? More complex products are sold and not bought, and the big competition will come from more simple products, that are bought and not sold. And it could well be that the new generation of competition comes from the start-up community, not from the established players.

On the regulatory and political fronts, things are extremely active and the burden of changing regulations in particular is large and increasing. On our table now we have new regulatory items in areas such as Group Capital, VA reform, RBC ratios and new cyber mandates. How do I ensure I am an active part of the dialogue in the creation of the regulations in the first place and then prepare myself to be able to meet the regulations once they are effective?

The danger of complacency around the markets is another area to highlight. Since 2008 the impact of world events has been very short lived and really had minor effects on the markets long term. Investors have known there is an implicit backstop in the event of a problem, i.e., Fed intervention, so that has helped create an underlying current of complacency. Is market risk being framed appropriately to account for this? As spreads tighten, how do we make smart decisions without reaching too far, and understand the implications and not take for granted 9–10 years of protected markets?

Big Data or Data Mining is another topic and opportunity that is very much front and center. Understanding the potential for Big Data in the life & annuity industry is still at an early stage, and clearly, there are big opportunities and potentially big rewards for those who act early. At the very least, better use of data will mean you can create a better priced product, that is better understood and better managed from a risk perspective. And of course, on the underwriting side, you can be more efficient in doing more with fewer data points.

Moving away from the overall industry perspective and looking more specifically at a big topic we have really focused on addressing at Athene, I would again have to start off with technology with a specific focus on cyber risk. Like all insurers, we are exposed to cyber risk by having a workforce that's required to be digitally connected.

For that reason, we do dedicate significant resources to managing that risk and we have brought in some great people from very large multinationals to run the program. Our program involves many layers of testing, including realtime monitoring, and penetration testing. We have software that looks for areas of compromise. We also look at historical data patterns to indicate where we may have been compromised where that isn't obviously apparent on the surface—a "silent" breach. And of course, we have software to test for phishing, etc.

I personally meet twice a month with our head of cyber risk. Also, one of my team chairs the Operational Risk Committee which the head of cyber works with very closely.

We also have a focus on third party risk. Our vendor function works very closely with our cyber team. From the outside, you might think this sounds like an outsized group for a company of our size, but we take third party risk very seriously, and we monitor key vendors very carefully.

The other big risk we think about all the time at Athene will not surprise you given our business model. That is asset risk. As you know, we have built up unparalleled expertise in being able to enhance yield on assets supporting long-dated liabilities. This, of course, has associated asset-side risks that have to be carefully monitored. We have a dedicated asset risk function that carefully monitors transactions and poses key questions and oversight to asset managers during the underwriting process. We are big users of collateralized loan obligations and alternatives, so the expertise required there is very specialized, and the risk management highly sophisticated.

I also highlighted changing regulation as a big issue for the industry and certainly that is another focus area for Athene. There are many parties involved in the issues around regulation,

including our Executive Vice President, Legal. We recently spent many hours with the group capital management team discussing the implications of the emerging capital standards.

Q: What are your views on what makes for an effective risk management framework? What have you done to implement such at Athene?

The evolution of our risk governance and risk management framework is an on-going continual improvement process and is something we are doing more and more on.

I personally spent months looking at Athene's risk management process before Athene went public in 2016, and we did make some adjustments in our governance structure as a result. For example, I carefully evaluated our risk appetite, risk limits, and stress testing work, with a view to ensure it was right-sized for Athene. And given Athene's short history, this merited an extra deep dive into our risk management framework. With our focus on M&A, it is particularly important that we have a dynamic framework. We must be nimble enough to change our risk management framework to adapt to our asset and liability mix. It is exciting that given the right strategic fit, we have an appetite for any type of liability, but this in turn creates challenges from a risk management front.

My responsibility in overseeing the risk management of such a fast-growing company includes ensuring each of the first, second and third lines of defense are all doing what they need to be doing in meeting their risk management responsibilities. I can't over emphasize the importance of this.

Another aspect of governance, and another that we are heavily focused on, is using all the information and data our company generates in a very positive manner. We continue to exploit technology to get more effective risk reports and analytics. Effective risk reporting enables us to make better, more informed decisions on our business. This includes having rapid turnaround times on our basic reporting to the board and various committees. In many instances we are now near realtime turnaround on risk reporting.

Q: On the topic of risk reporting, what do you view as things that can be done to make for risk reports that are actionable and genuinely assist management in making strategic decisions?

I have been very influenced by my Navy experience in having a strong orientation towards dashboarding. I use dashboards incessantly—any chance I can get. At Athene we have key dashboards across all of the risks we face. For board reporting, we lay out our current risk position versus our limits. The limits

include credit, rates, liquidity, and equity. We focus our reports on the things that are critical to our business, not inundating our audience with too much information. It is my job to take the noise out of the information and to bring things down to the most salient points. Our company's senior management dashboard is just two pages in length. In my mind, this is appropriately sized for a senior audience and ensures we get the right points on the table for senior level meetings.

Of course, we also have deep dives of our asset portfolio, as well as all the other key risk areas such as operational and regulatory. But the detailed reports are not for top-of-the-house digestion.

Q: Much attention has been given by the industry in recent years to building out model risk management capabilities. What would you view as the key to a successful model risk management program?

Model risk management is very important especially on more complex liability profiles. As part of our operational risk strategy we have four key component parts:

- Cyber risk,
- Governance risk,
- Continuity risk, and
- Model risk.

Then for model risk, we have established three pillars of activity:

- Tiering and prioritization of models,
- Risk rating of each model, and
- The type of review that is appropriate for each model, in the light of its prioritization and risk rating.

There is then the question of who does the work. Some companies have invested in building out a separate, centralized model risk management function, while others have taken a more decentralized approach, and give the first line of defense more direct responsibility. There are a number of ways to approach it and I wouldn't say any one approach would necessarily be better than the other. Having a smaller group at the central level might help better facilitate tapping into the talent and knowledge that

resides elsewhere in the company, so there are potential advantages there. The fact that model risk management is such a big area of concern for the industry it is not a surprise.

Q: Do you think it is useful to have an internal company ("economic") view of capital?

I think taking an internal perspective on capital has its uses. At Athene, we do look at incremental risk costs and we are very mindful in making strategic decisions that consider how much risk capital are we eating up for any given action and gauging whether it is the right trade-off.

We look at our various lines of business—retail, reinsurance, institutional and inorganic—and in considering what to do from a transactional basis, we measure the incremental return from risk capital. We spend a lot of time looking at the risk-return profile. So our "economic" framework is all about understanding the incremental changes to liability and asset risk profiles that arise from any given decision.

Q: Are there any other big topics you wanted to raise that we haven't already talked about?

One thing that we haven't covered in our discussion that we should highlight is the topic of culture. Having the proper culture in an organization is very important to successful risk management and it is often underestimated. That includes having the right incentive structure which will help build the right mindset. We have an extremely good culture in place at Athene. It starts right at the top and flows throughout the organization. If you don't have the right culture, everything else is for naught. My ability to do my job is entirely dependent on having a team around me that understands the importance of risk and the role they play in managing risk. We are all acting like owners every day. ■

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Effective ERM Stakeholder Engagement

By Kailan Shang

This article summarizes some key points of the research paper entitled "Effective ERM Stakeholder Engagement." The paper can be found at https://www.soa.org/resources/research-reports/2018/effective-erm-stakeholder/.

R isk management has developed quickly in the past decade in the insurance industry and is playing a more important role in business decision-making. The evolution of risk management keeps bringing changes to existing business management. It takes time and resources for people to learn, understand, validate and finally agree on these changes.

CURRENT PRACTICE

To understand risk management professionals' experiences obtaining stakeholder engagement and current best practices for doing so, two surveys were conducted in the actuarial risk management community: a pilot survey and an online survey. The pilot survey targeted senior executives through phone and face-to-face interviews. The discussions were open-ended

to collect ideas about the issues prevalent in ERM buy-in. An online survey was then sent out to the members of the Joint Risk Management Section (JRMS) and the International Network of Actuarial Risk Managers (INARM). Risk officers (both internal and external) and internal stakeholders excluding risk officers (senior management and first line of defense) were asked different questions. Here, risk officers include CRO, second and third lines of defense and external risk management consultants. The main findings of the online survey are summarized in this article.

1. Among all internal stakeholders, senior executives have the widest gap between the importance they ascribe to implementing ERM and their actual supportiveness.

2. In general, internal stakeholders excluding risk officers have a more optimistic view of ERM development in a company than risk officers.

3. Demonstrating and quantifying the value of ERM is the most difficult challenge faced by risk officers, as shown in Figure 1. Getting support from senior management is the least challenging one.

4. According to risk officers, relationship building, external stakeholder opinions and effective communication of difficult risk management concepts are the most used and most effective methods of ERM stakeholder engagement, as shown in Figure 2. Stakeholder analysis and embedding risk management goals into performance measurement are less used but more than modestly effective.

Figure 1
ERM Stakeholder Engagement Challenges
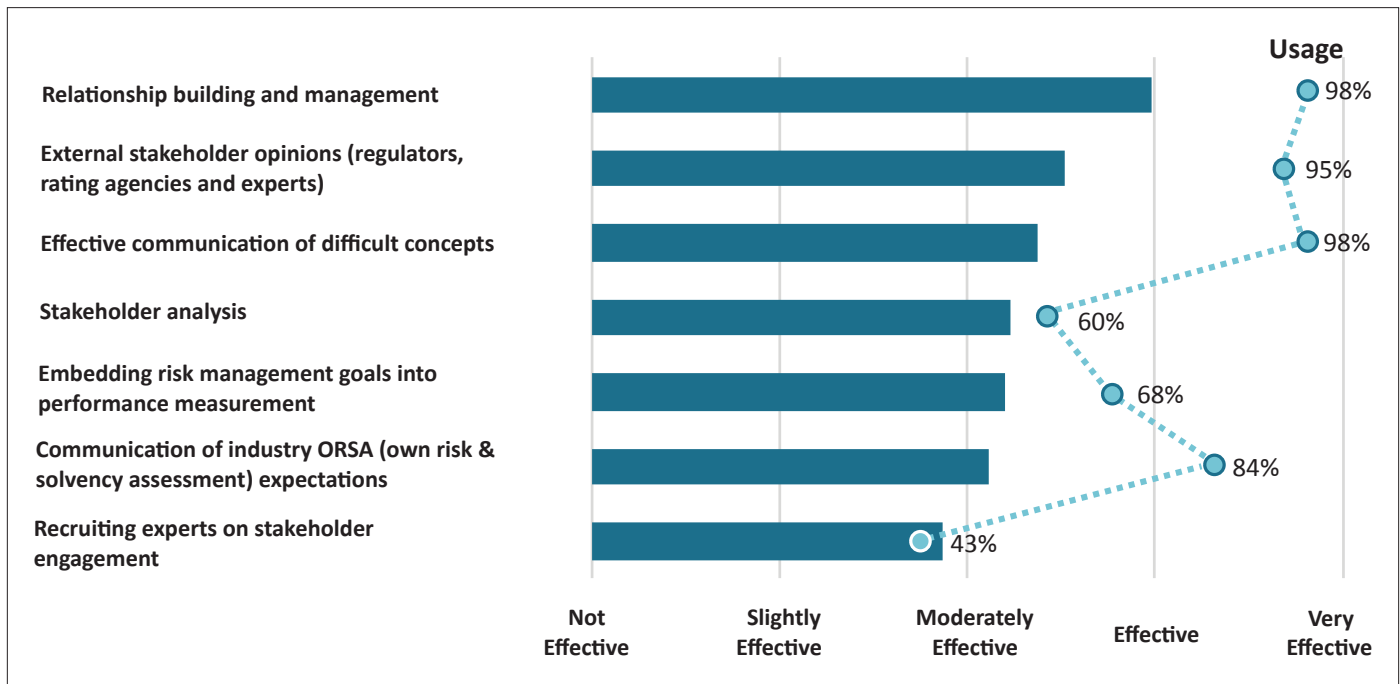
Figure 2
ERM Stakeholder Engagement Effectiveness

Usage

Category	
Relationship building and management	98%
External stakeholder opinions (regulators, rating agencies and experts)	95%
Effective communication of difficult concepts	98%
Stakeholder analysis	60%
Embedding risk management goals into performance measurement	68%
Communication of industry ORSA (own risk & solvency assessment) expectations	84%
Recruiting experts on stakeholder engagement	43%

Not Effective | Slightly Effective | Moderately Effective | Effective | Very Effective

Figure 3
Internal Stakeholder Experience with ERM

- I received enough training to understand risk management policies and reports.
- I think risk management analysis/tools are helpful for my own work.
- I received enough information on risk management projects.
- My interests and concerns have been fairly reflected in risk management projects.
- I have enough and appropriate resources to meet new risk management requirements.
- My performance measurement is linked to risk management.

Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree

5. Internal stakeholders excluding risk officers still face a lack of resources as a constraint to meeting new risk management requirements, as shown in Figure 3.

6. Face-to-face interviews are the most effective method of ERM communication, followed by regular reporting and workshops.

CHALLENGES

Major challenges are identified based on the survey responses.

1. **The benefit of risk management is difficult to measure**. Except when a risk management activity is driven by regulators or it helps improve the company's credit rating, the benefit of the project may not be apparent to some stakeholders. In normal periods, the cost of risk hedging or risk mitigation may be seen as a drag on profit. In an extreme situation, risk management may be blamed for losses even though the company was taking a risk exceeding its risk tolerance to stay competitive in the market.

2. **Risk management activities may also be affected by insufficient resources and internal politics**. Risk management teams may be understaffed. ERM initiatives may be deferred because of insufficient financial support. New ERM policies may change the status quo and encounter resistance in the company.

3. **Risk management could require material changes to existing practices and create additional work**. It takes time and effort for people to understand, test and agree on changes. It may also require additional tools and human resources which may not always be available.

4. **The role of the risk management function and the chief risk officer may not be clearly defined**. Risk management

projects usually require involvement of many departments and it is not always clear who is accountable for the final result.

5. **Risk management concepts are rarely self-explanatory**. They discuss stress scenarios, extreme events and probabilities requiring statistical knowledge. It becomes even more difficult to explain advanced models used in economic scenario generation, nested stochastic calculation, tail risk management, risk aggregation and so on.

6. **The credibility of risk assessment results has room to improve**. Risk assessment deals with extreme events which may not be observed in recent history. Without validation, stakeholders may be inclined to make judgments in a heuristic way.

7. **Model risk is high for risk management analysis**. Risk management quantitative models are complicated, and the results are sensitive to assumptions. This sensitivity and complexity leads to high model risk which may hinder the contribution of risk management analysis to business decision-making.

8. **The value of risk management to improved decision-making may be overlooked**. Stakeholders may spend minimal time and resources to meet the requirements but not use the information and analysis to help make business decisions.

ENGAGEMENT STRATEGIES

To address the issues raised in the survey, several areas can be focused on to improve risk management stakeholder engagement. Figure 4 shows a standard stakeholder engagement process with suggested areas of improvement for each phase.

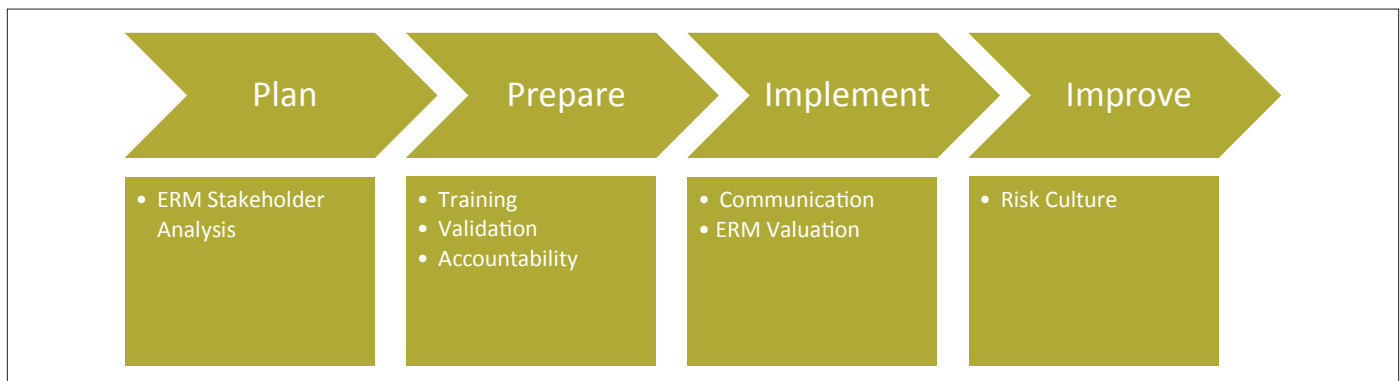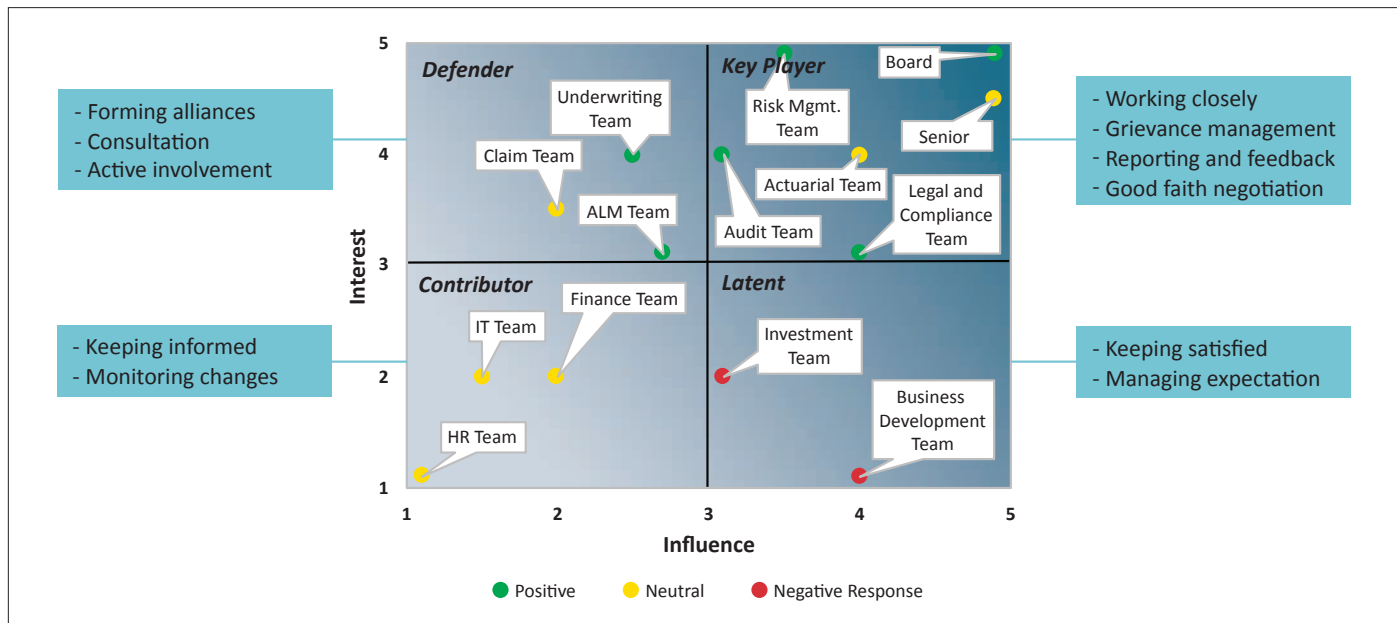Figure 4
Stakeholder Engagement Process

Figure 5
Sample Stakeholder Mapping

Stakeholder analysis helps predict stakeholders' responses and helps design appropriate strategies to improve stakeholder engagement. ERM stakeholder analysis can be conducted to identify stakeholders and analyze their interests, concerns, influence, and expected responses to an ERM initiative. Stakeholders can then be mapped into different engagement types with corresponding engagement strategies.

Figure 5 illustrates the mapping of internal stakeholders for an ERM initiative to bring risk adjusted measures into a business decision. Each stakeholder's interests, influence and responses are evaluated. A stakeholder has a high interest if he/she will be materially affected by ERM activities. A stakeholder has a high influence if he/she has a lot of power to change the course and outcome of ERM activities. The probable responses from stakeholders are jointly determined by their current level of interest, concern, and relevant knowledge and experience.

Stakeholders can be divided into four classes based on their interest and influence: key player, latent, defender, and contributor. Key players are stakeholders with both high interest and high influence. They need full engagement for the success of ERM activities. Defenders are usually helpful alliances to provide useful information and defend the risk team's positions in group decision-making. Latent stakeholders need to be adequately informed but not so much that they get overwhelmed. Contributors are the least affected by or involved by ERM activities but need to be kept informed to avoid any surprises.

Different key engagement strategies are associated with different types, as shown in Figure 5.

Response, the third dimension, is reflected by the color of the dots representing the stakeholders in the circle in Figure 5. Stakeholders with negative response need more focus within each group.

Stakeholder mapping is not constant for all risk management initiatives. A stakeholder may belong to different types depending on the specific ERM activity. Changes in stakeholder mapping are also expected as stakeholders gain more knowledge and experience related to risk management. Therefore, it needs to be updated regularly.

Effective communication can help improve transparency, avoid misunderstandings and attract stakeholders. The importance of ERM needs to be communicated from the top. Risk communicators should know their audiences, use evidence-based communication as much as possible, embedding actionable suggestions into risk communication and maintaining a high standard of credibility.

More stringent regulatory requirements and many other risk management initiatives such as internal capital models, model risk management, and the integration of risk appetite and strategic planning are progressing well in the insurance industry. It requires a significant amount of extra effort to gain the knowledge and experience to make these changes. Usually, **training**

focuses on the second line (risk management and compliance functions) and third line of defense (internal audit) in a company. The first line of defense (operational management) may have less training than it needs. Training is better designed according to people's roles and prior knowledge of the subject. In addition to project-based knowledge training, it is helpful to have a long-term training plan for all stakeholders.

Knowledge gap analysis can be used to design a personalized training plan for each stakeholder. Figure 6 illustrates a gap analysis for risk management knowledge. The knowledge of risk management is classified into three categories: risk management framework overview, impact on business/work and operational requirement. The black part of each circle represents the percentage of knowledge that an internal stakeholder holds for a risk management knowledge item. The goal is to fill the white part to remove knowledge gap.

A company usually has multiple priorities competing for limited resources. The benefits of risk management are recognized in principle but may not be readily observed. This could put ERM priorities at a disadvantage in the competition for resources. **Evaluating ERM activities** is helpful for addressing this issue. Tangible benefits of an investment in risk management capabilities include lower cost of borrowing, risk mitigation benefit, capital efficiency, and better business decisions. They can be quantified and aligned with the organization's traditional project decision framework for project comparison and selection.

Validation is important to improve the credibility of ERM analysis. Stress testing and partial validation are beneficial in the presence of insufficient data. Stakeholders will have a higher confidence in using validated risk management analysis for decision-making. When communicating an assumed stress scenario with stakeholders, it is not necessary to assign a

Figure 6
Sample Risk Management Knowledge Gap Analysis

Knowledge/Skill		Board of Director	Senior Management Leader	1st Line of Defense			2nd Line of Defense			3rd Line of Defense		
				Leader	Middle Management	Other Staff	Leader	Middle Management	Other Staff	Leader	Middle Management	Other Staff
Overview	Risk Concept	●	◐	●	◕	●	●	◐	●	●	●	◔
	Risk Appetite	◐	◐	●	●	○	●	◐	◔	◕	●	○
	Risk Governance	◕	○	◐	◑	◕	●	●	◐	◕	●	◐
	Risk Control	◕	◕	○	◐	◕	◔	○	◔	○	◔	●
	Risk Culture	●	◕	●	●	○	◐	◐	●	●	◐	◔
Business	Risk Related Work	○	●	◔	●	◕	●	◐	○	◐	●	●
	Expected Engagement	◕	◐	◐	○	●	◕	●	●	◐	◔	●
	Decision-Making	●	◕	◔	◐	◕	◐	●	●	◐	◔	●
	Feedback	◐	●	●	◕	◐	○	◕	◔	◕	◐	◕
Operation	Risk Reporting	●	◐	◕	●	●	◕	●	◔	◕	◐	●
	Risk Limit	●	◔	◕	◔	●	◔	◕	●	◔	○	●
	Anti-Money Laundery	●	●	◐	◔	●	◕	◐	◐	◐	◐	●
	Cyber Security	○	◕	○	●	●	◔	◔	◕	●	○	●
	Privacy	●	◐	◕	○	◔	◐	●	◐	◐	●	●
	Social Media Policy	◔	◔	◐	◐	●	●	●	●	●	◕	●
	Risk Issue Escalation	●	◔	◐	●	●	◕	◔	●	●	●	●

Figure 7
Risk Culture Improvement Process
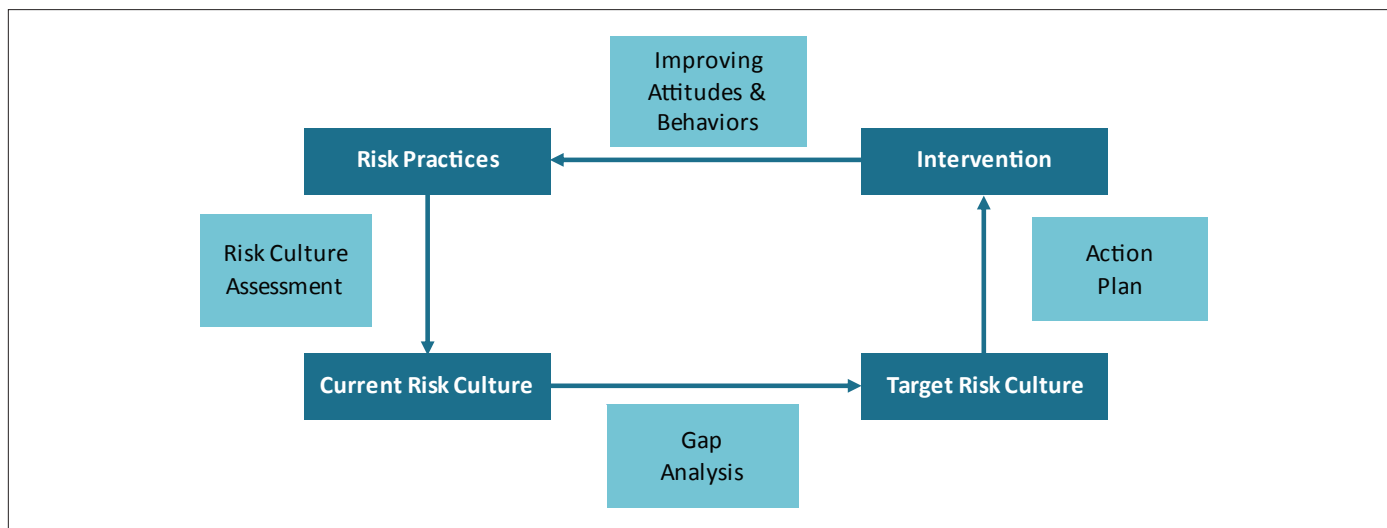
probability to the scenario. An alternative approach is to put the scenario in the context of history by ranking it among historical extreme events. It is easier for stakeholders to understand the severity of a specific historical extreme event against which risk management aims to protect.

Accountability is important for making sure that risk policies and strategies are actively followed within the organization. Risk ownership, roles and responsibilities of the CRO, and risk management functions need to be clearly defined and communicated so that stakeholders know their goals and what to expect from a risk management project.

The long-term goal of a risk management system is to have a **healthy risk culture**. Risk culture reflects the attitudes and behaviors of a group of people regarding risk taking and risk management. Culture is the essence of a risk management system in that it defines what behaviors are encouraged or not. A good risk culture fosters the improvement of risk management from the inside of an organization. No matter how good risk management policies and models are, without a positive risk culture, their full value is unlikely to be realized.

Improving risk culture and ultimately ERM stakeholder engagement is a complicated and somewhat subjective process. As shown in Figure 7, risk practices need to be assessed to understand the current risk culture status. Gap analysis can then be performed against the target risk culture. Action plans can be made to improve the risk attitudes and behaviors in the organization.

Exact practices of assessment, gap analysis and intervention to improve risk culture depend on each company's specific situation and preference.

CONCLUSION

Risk management is a fast-growing area in the insurance industry. It has brought in new concepts, tools and methods of business decision-making. However, integrating risk management into business decision-making and corporate governance is still challenging. Ineffective ERM stakeholder engagement can be the result of inappropriate risk attitudes, lack of relevant knowledge and experience, insufficient resources, vague responsibilities, and unclear performance measurement.

ERM stakeholder engagement can be improved using strategies applied widely in project management and business operations. The uniqueness of risk management initiatives requires special considerations in stakeholder analysis, communication, training, valuation, result validation, accountability, and risk culture. With a systematic approach to improving ERM stakeholder engagement, the effectiveness and maturity of ERM can be enhanced and risk management can be more deeply embedded into business decision-making. ■

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Joint Risk Management Section (CAS, CIA, SOA)
https://www.soa.org/Files/resources/research-report/2018/2018-ul -second-guarantee-survey.pdf

National Risk Management: A Practical ERM Approach For Federal Governments
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https://www.soa.org/Files/resources/research-report/2018/national -risk-management.pdf

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Presentation: Actuarial Risk Analysis using Predictive Analytics, Segmentation and Decomposition Techniques
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https://www.soa.org/Files/static-pages/research/topics/actuarial -analysis.pdf

Letting Insurance Asset Data Speak for Itself – Asset Allocations of Life Insurers in Asia
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https://www.soa.org/research-reports/2018/2018-asia-insurance -asset/

Enterprise Risk Management: Global Best Practices and Key Challenges in Asia
Milliman
http://www.milliman.com/uploadedFiles/insight/2018/ERM-best -practices-asia.pdf

Big Data and Insurance: Implications for Innovation, Competition and Privacy
The Geneva Association
https://www.genevaassociation.org/sites/default/files/research-topics -document-type/pdf_public/big_data_and_insurance_-_implications _for_innovation_competition_and_privacy.pdf

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https://www.ey.com/Publication/vwLUAssets/ey-global-insurance -trends-analysis-2018/$File/ey-global-insurance-trends-analysis -2018.pdf ■

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