Global Insurance Market Opportunities

Riding the Innovation Wave
# Contents

**Introduction** ................................................................. 1
  Increasing Customer-Centricity to Drive Innovation in Insurance ................. 4

**Section 1: The Insurance Market** ........................................ 7
  The Insurance Market .......................................................... 8

**Section 2: Risk** ............................................................... 11
  Risk: Introduction .................................................................... 12
  Autonomous Vehicles: Implications for Insurance ..................................... 14
  Doug Parker’s Views on Self-Driving Innovation ..................................... 15
  Cyber: Solutions to a Distributed Problem .......................................... 18
  Brexit: The Road Ahead ................................................................ 20
  Homeowners Coverage around the World ............................................ 21
  Takaful—Opportunities and Challenges ............................................ 22
  US Reserve Adequacy and the Link to the Underwriting Cycle ............... 23

**Section 3: Capital** ............................................................... 27
  Capital & the Insurance Value Chain ............................................... 28
  Mortgage: Capital Needs Creating New Growth .................................... 30
  Opportunities in Investments ................................................................ 32
  Evolution of Capital Modeling ....................................................... 35

**Section 4: Data & Analytics** ................................................ 37
  Data & Analytics ......................................................................... 38
  Innovations in Claims Management .................................................... 40
  Agricultural Risk Market: Opportunities for Growth ............................ 42
  Bridging the Catastrophe Protection Gap .......................................... 45

**Section 5: Perspectives** ...................................................... 49
  Disruption: A Force to Increase Customer Value .................................... 50
  Peter Gunder’s Views on Innovation Today .......................................... 52
  The Foundation of Innovation: Operational Excellence .......................... 54

**Sources, Notes, and Contacts** ............................................. 57
  Sources and Notes ...................................................................... 58
  Contacts .................................................................................... 60
Introduction

Insurance is a product for an imperfect world. Ask customers what the perfect insurance product would look like, and you will likely be told they want no accidents—that perfect risk avoidance is preferable to post-event indemnification. Fortunately, perhaps, for those of us employed in the business of risk and insurance, we do not live in a perfect world—far from it. The imperfections of the world today seem to be cast in increasingly stark relief.

As 2016 has progressed so far, the headlines are familiar: Zika virus, Brexit, gun violence between law enforcement and the communities they serve, terrorism around the globe—and always in the background, the uncertainties of climate change, technological advance, and the global economy.

One thing is certain: insurance will remain a reality of our daily lives. In fact, with all this uncertainty, one might well assume that the relevance of insurance to society and business would be on the rise. And yet in mature economies, we see the opposite: insurance premiums have not kept pace with GDP growth over the last 10 years. What is going on?

The 2016 edition of Global Insurance Market Opportunities reports on our current risk environment, in addition to the ability and willingness of insurers and capital providers to address the risks we face today. As done in previous editions, we pay close attention to the critical role of data and analytics in bridging the gap between risk and capital to create viable insurance market solutions. This year, we pay greater attention to the forces of innovation and disruption that now confront the industry. Having succeeded in overturning traditional business models in industries such as advertising, media, and transportation, these forces are now scrutinizing the insurance value chain and looking for opportunities to outperform incumbents at their own game (or at least profitable components of it). How the incumbents respond to the changes occurring within the industry will determine the stories we are discussing in 10 years’ time.

Our Situation

It’s easy to sound alarmist in the current climate and veterans of the insurance industry cannot be faulted if they feel like they are under siege. What the alarmist headlines miss is the larger context: the insurance industry has in fact had a long track record of successful innovation. Examples include catastrophe modeling, credit-scoring, CLUE reports, multi-peril coverage, and the recent embrace of alternative capital which now stands at USD 75.1 billion worldwide. We must not overlook our track record of successful innovation in the areas of risk, capital, and data and analytics. And yet, that track record—along with the external forces of technology—has set up the state in which we now find ourselves:

- **Risk:** Partly due to the past successes of insurance and safety initiatives globally, the world has in many ways become safer. Workplace and automobile accidents continue to decrease each year, as do fires and third-party liability claims. These risks underpin the traditional sources of premiums, making the insurance industry a victim of its own success. In contrast with these trends are the emerging, difficult-to-grasp risks mentioned earlier. The “middle” of risk is disappearing.

- **Capital:** The insurance industry has welcomed more forms of risk-bearing capital, with USD 75.1 billion of capital now deployed from hedge funds, pension funds, and other alternatives to insurance and reinsurance balance sheets. In last year’s study we discussed how these alternative sources of capital are “Uberizing” insurance by bringing increased supply competition.

- **Data and analytics:** The hype and lofty promises of “Big Data” to revolutionize business are well known. But closer to ground, innovations in analytics using new sources of data are breathing new life into the industry, addressing risks ranging from the traditional (auto and home) to the rapidly emerging (cyber risk). We cover many of those innovations in this study, as well as innovative new approaches to other parts of the value chain such as claims and investments.
To succeed at innovation, it is imperative that companies take a hard look at their internal capabilities—and in particular, develop a customer-centric focus.

**Customer Centricity**

With all this talk of innovation and disruption, there’s a tendency to focus on technology as well as external factors. We argue that in order to succeed at innovation, it’s imperative that companies also take a hard look at their internal capabilities—and in particular, develop a customer-centric focus. This means looking at your organization with a viewpoint that takes into account your company’s value proposition as well as your customer’s needs and expectations. This requires humility as well as a willingness not to rest on past successes.

**About the Study**

This study, now in its 11th year, has evolved from its beginnings as a quantification study for enterprise risk management. We now take an expansive view of issues related to global risk to encompass global growth, profitability, and market trends. We have organized the study around our key themes of risk, capital, and data and analytics. We strive to have this facilitate a broad discussion on matters of risk for participants across the value chain, from corporate CEOs and risk managers, to traditional insurers and reinsurers, to new participants looking to deploy their investment and capital into the industry.

Analytics remains at the core of everything we do. Highlights from our quantitative research can be found throughout the study. The study continues to provide the insurance industry’s leading set of risk parameters for modeling and benchmarking underwriting risk and global profitability. All parameters are produced using a consistent methodology that we have employed since the first edition. For the sake of convenience, this year these parameters have been moved to a self-contained companion volume, “Global Risk, Profitability, and Growth Metrics.”

Beyond risk modeling, we can provide our clients with very granular, customized market intelligence to create business plans that are realistic, fact-based, and achievable. With a global fact base and broad access to local market practitioners, we are equipped to provide insight across a spectrum of lines, products, and geographies. Inpoint, the consulting division of Aon, helps insurers and reinsurers address these challenges, from sizing market opportunities to identifying distribution channel dynamics, assessing competitor behavior, and understanding what it takes to compete and win. Our approach leverages Aon’s USD 350 million annual investment in analytics, data, and modeling to help our clients grow profitably. All of our work at Aon is motivated by client questions.

We continue to be grateful to clients that have invited us to share in the task of helping them analyze their most complex business problems. Dynamic and interactive working groups always lead to innovative, and often unexpected, solutions. If you have questions or suggestions for items we could explore in future editions, please contact us through your local Aon Benfield broker or one of the contacts listed on the last page.
Three keys to innovation in the face of disruption:

**Be humble**
about your firm’s decision making biases,
in order to make rational, fact-based
decisions in the face of severe uncertainty.

**Be ruthless**
in assessing your internal capabilities,
to understand what truly differentiates
you and your ability to serve clients.

**Be disciplined**
in scanning the external environment,
in order to identify new ideas and
new talent with efficiency.
Increasing Customer-Centricity to Drive Innovation in Insurance

Focus on your client. It’s simple to say, but the challenge is in the details.

Innovation is a central theme of this study. When we talk about innovation, we need to remember that the key to successful innovation is, in part, to focus on the needs of the customer—whether to meet an existing need more effectively, or to meet a need that is emerging as the risk landscape changes.

Beginning with the voyages that were insured at Lloyd’s in the 1600’s, insurance has had a long history of driving innovation and contributing to economic advancement. Yet despite the long arc of innovations, in recent years the insurance industry seems to have lost some of this traditional focus on developing innovative solutions for its customers. With all the volatility in the world today as well as changing expectations of a more wealthy (on average) population, it’s striking that the value and relevance of insurance to society is not on the rise.

Over the last 10 years, insurance premiums have decreased relative to GDP in the US and most developed economies. According to the American Customer Satisfaction Index, property-casualty insurers ranked 22 out of 48 industries for customer satisfaction—ahead of banks and airlines but behind most retailers, manufacturers, and food-related industries.

This statistic is not a surprise if we remove the “industry” hats of insurance professionals and put on the “customer” hats that we wear as buyers of insurance for our families and businesses. Insurance is not an easy product to understand, and the purchasing process is often unnecessarily confusing even for those of us who work with the product for a living. If the belongings in your home are damaged by water, does it matter to you whether that water came from a sewer system backup or from a flood? As a homeowner, no. As an insurance buyer, yes—it matters a lot. In the US today, homeowners insurance typically covers the first but not the second of these events—if you want insurance for damage from flooding, you need to buy a separate policy. The reputation of insurers to deny claims—rightly or wrongly—further adds to skepticism from consumers about the value of the insurance product. This reputation is admittedly a perception, but what is clear is that our industry is not delighting customers with an impression of providing new and innovative solutions.

Insurers have in fact been somewhat sheltered from considering customers. We estimate around 60 percent of insurance purchase is mandated by regulatory or contractual requirements, which means that offering a good product has not been critical to the majority of insurance sales. But it is exactly when looking at these inefficiencies, propped up by regulation, that innovators and disruptors see opportunities for improvement and for profit.

Today, we see new ventures forming with the intention to disrupt our industry, and there is a lot of investment heading in this direction. In 2015, globally, we tracked USD 2.6 billion in our risk domain. We estimate it is USD 9 billion over the past several years across the world. This venture capital is the other form of “alternative capital” that is impacting our business, and it is generating the conditions for potential disruption.

The history of industries that have suffered disruption is the history of internal experts misdiagnosing external ideas as “not very advanced.”
To create and capture value in this current environment, the insurance industry needs to get back to its roots of serving clients. The story of Uber is well-known, giving everyone access to their own personal driver and eliminating many of the inefficiencies in the traditional car service and taxi process. To illustrate a client-centered view of insurance, we offer three examples of innovations within the industry:

- **Metromile**—Why pay hundreds of dollars a year to insure a car that sits in the garage most of the time? Metromile offers pay-per-mile motor insurance in the US, through an intuitive phone app. A simple customer experience with a simple bill.

- **Aon Client Treaty**—a way to rethink the subscription insurance model. With sophisticated analytics, Aon has transitioned a portion of its placements at Lloyd’s from individual account underwriting to treaty underwriting—giving Lloyd’s an opportunity to take more risk on behalf of clients while bypassing the often arduous underwriting process for many placements.

- **Private health exchanges** have enabled employers to offer more choice in health care plans and mitigate the rise in annual health care costs by introducing competition at the consumer level. As of January 1, 2016, more than 1 million active employees and their eligible dependents from 55 companies had enrolled in health benefits through the Aon Active Health Exchange.

Of course, a customer-centric view has real challenges to overcome, particularly in making a complicated financial arrangement understandable to a wide audience. Insurers like the idea of charging the right price for the right risk. Customers generally dislike this idea, unless it happens to mean lower prices. There is a tendency for those of us in the industry to look for things where it is easiest to observe or where it is easiest to record results (what decision scientists call the “streetlight effect” or “observation bias”). But will taking this tried-and-tested approach to the extreme lead to longevity and profitability, foster innovation and, ultimately, customer satisfaction? We need to focus on sustainable value—not simply more of what’s familiar.

So is this merely a call to understand what the customer wants? There is more to being customer-centric than being open to customer needs. While insurers need to be sensitive to external signals, they also need to be ruthless in assessing internal capabilities. It is natural to value components of your business model based on past performance, but a customer-centric posture requires us to examine internal resources against the criteria used by customers. Unfortunately, in large organizations the experts or experienced decision makers see things differently than those outside; we often overestimate our internal capabilities and assess new outside ideas as inferior. The history of industries that have suffered disruption is the history of internal experts misdiagnosing external ideas as “not very advanced.” The challenge for all incumbents is that the criteria for “advanced” is not always correlated to what customers value.

With all the buzz about disruption right now, the external environment can look very chaotic. Firms need to be disciplined as they assess this environment. It is natural to feel the urge to “do something” to address these external challenges—for example, to set up a branch office in Silicon Valley, or to appoint someone as Chief Innovation Officer. Some firms have done this. But to be successful, we need to be disciplined. This means striking the right balance: being specific about what we are scanning for, while also being open minded and flexible.

Riding the innovation wave is a balancing act. If this were easy, we wouldn’t see industry disruptions—the incumbents would always win. What does all this mean for us as we form strategies and prepare for the future? Think about your customers. Think about what they need, and what you’re really good at providing them. Be honest about what your strengths are as well as what they are not. And remember it is critical to focus on value—in both the near term and the long term.
Customer Centric Innovation

Clearly, being customer centric is important to all organizations. But how do you know if your organization is really customer centric? Is having market research and analytics on your clients’ actions sufficient?

It is worth looking beyond having a customer segmentation logic, priority “customer personas,” and a customer needs gap analysis. What else is needed? We see three areas to understand.

1. **Understand the business logic for every significant process in your organization.**
   - What was the original rationale for all the processes and procedures in your firm?
   - Is that rationale still valid given today’s competitive and technology-driven environment?

2. **Understand what your organization is distinctively good at compared with your competitors.**
   - What would an outside investor think about each of your capabilities?
   - How do you stack up objectively in the market, from a customer’s perspective?
   - Where are the true economic sources of your “profit”?

3. **Understand the external innovations that create new opportunities for your organization.**
   - What is catching the attention of new segments of clients and investors?
   - How are changes in the environment translating into new customer needs and expectations?

**Insurers with a more comprehensive approach to being customer-centric will be best positioned to make the decisions that will lead to long-term success.**
Section 1

The Insurance Market
Three market forces and five links in the insurance value chain

Three interacting forces make up the insurance market: demand from risk owners, supply from capital providers, and the data and analytics risk assessment capability needed to join the two and effect a transaction.

There are two different alignments of these forces in the market. When data and analytics capabilities are bundled with capital, we have an insurance company. When they are bundled with demand from risk owners, we have an advisor or broker.

The need for clear and objective advice on both the demand side—to the risk bearer or insurance consumer—and on the supply side—to the capital owner—increases with risk complexity. Large, homogeneous markets can rely on competition between suppliers to drive down prices for consumers, reducing the need for independent advisors. Increasingly we see this direct, or near-direct, model winning out in personal lines. Not surprisingly, this is an area of the insurance value chain that many of the “insurtech” startups are targeting.

At the other end of the risk scale, buyers of complex corporate covers and large reinsurance programs require analytics expertise aligned with their own objectives. Increasingly, they use brokers and advisors to advocate on their behalf against the sophisticated entities representing capital.

Last year, we introduced this framework to provide context to the trends seen in each area of the insurance market—indeed, each of these forces is now subject to both change and disruption at a level not seen in recent history. Similar to last year’s study, we have dedicated a section to each of these forces of risk, capital, and data and analytics, focusing on the relevant trends we observe in each area.
To further expand on the themes, we introduce a discussion of the insurance value chain, which is comprised of five links:

- **Customer** is the source of the ultimate risk. Insurers access customers either directly, and through advisors or brokers. The MGA model can blur the line between customer and paper.

- **Claims** is often seen as the core of what an insurance company does, providing indemnification to the customer who has suffered from an adverse event. Behind the scenes, a variety of services exist to make the claims process work optimally for the customer.

- **Capital** is the actual deployment of risk-bearing capacity. Capital provides value to customers through liquidity and financing to absorb adverse loss experience; in many ways, Capital “is” the insurance product, making possible the claims payments to serve the customer.

- **Paper** is the provision of insurance paper. The value provided in this segment centers around the provision of regulated paper that the customer can use to meet various insurance needs.

- **Investment** is the business of managing insurance assets, both those provided by the customer through premiums and those provided by capital providers.

This value chain has been set in the insurance industry for a long time, but never has the industry seen so much potential disruption to the ways that these linkages have traditionally been delivered. Insurers ought to do a careful examination of their participation in this value chain, both to recognize their core strengths and to identify weak links. Certainly, the new competitors who aim to disrupt the value chain are looking for the same weaknesses—to them, these are opportunities! We will explore these linkages further in the Capital and Perspectives sections.

The data and analytics force has been most recognizably applied to the customer and capital links in the value chain—actuaries have done this for centuries in pricing and reserving functions—but data and analytics really play important roles across all the linkages represented. We will discuss examples of innovative approaches to claims management, investment management, and capital modeling in the course of this study.

In the next sections we will look at important topics affecting risk and capital: trends observed in the market as well as solutions that are emerging to address them. We will then look at how analytics can—and must—provide the “glue” between risk and capital to ensure a growing, thriving insurance market over the coming decade. We believe that while data, technology, and analytics are driving many of the emerging risk perils, they simultaneously hold the promise of delivering innovative solutions through the new capabilities they enable.
Global Insurance Market Opportunities

**The Industry in 2015**

- **Global insurance premium**
  - USD 5.1 trillion

- **Global insurance capital**
  - USD 4.3 trillion

- **Global property casualty combined ratio**
  - 98.6%

- **3% growth in global insurance capital**

**New Capital and Innovation**

- **200+ startups**
  - challenging the traditional insurance industry model

- **USD 2.6 billion**
  - invested in insurance disruption in 2015

- **USD 9 billion**
  - invested in insurance disruption during the last several years globally

- **More than USD 75.1 billion**
  - in alternative capital worldwide
Section 2

Risk
Almost everywhere we look today, we see evidence of heightened levels of risk. Economies in many parts of the world are fragile, with more than USD 10 trillion of government bonds now trading at negative interest rates, ballooning government debt, and alarming levels of bank debt in China. Even when headline statistics trend favorably, the underlying trends can be unfavorable. For example, while unemployment is historically low in the US, labor-force participation rates are also historically low.

Politically there has been a resurgence of nationalism around the world, as the Cold War has given way to inter- and even intra-country struggles between peoples—sometimes with surprising consequences. For example, honoring the rights of indigenous peoples, endorsed by the United Nations in 2007, greatly complicates risks for multinational companies. Within countries, heightened levels of income inequality are driving the political agenda, and we are still working through the often adverse regulatory impacts of the Global Financial Crisis.

Socially, younger generations are increasingly setting the agenda as the politically and economically dominant age group. These individuals have grown up in an Internet-enabled world and they are interacting and consuming in radically different ways than their parents. They have expectations for service, choice, and ease of doing business calibrated to the very best online service experiences—levels against which insurers find it very difficult to compete. Social media ensures consumers are better informed about their needs and options. It also provides greater transparency on pricing, and, in the event that service does not meet their expectations, gives them a voice for their complaints. The author Daniel Pink writes that we have transitioned from an age of caveat emptor to an age of caveat venditor: seller beware!

2015 represented the hottest year recorded globally and to date, 2016 has seen a far higher level of natural catastrophe activity than recent years. Flood events in Europe and China and massive wild fires in Canada have each caused billions of dollars of damage. Stress in property lines of business shows no signs of abating.

The scientific world continues to astonish, particularly with technological developments. At the same time, clouds gather:

- **Moore’s law**, which has predicted or driven the development of microchips for over forty years, is waning.
- **Cyber risk** has become a top concern for organizations globally, with many high profile breaches having C-suite implications.
- **Antibiotic resistant bacteria** threaten to undo fifty years of medical progress, affecting our ability to respond to common infectious diseases. There’s a very real threat that, if resistance to treatment continues to spread, our interconnected, high-tech world may find itself back in the dark ages of medicine.
- The world continues to ignore the real and material risk of **pandemic**—dangers illustrated by a recent near-miss with Ebola.
- **Behavioral and lifestyle-driven morbidity and mortality trends** are all adverse and their treatment is consuming unsustainable amounts of resources in many countries.

Technological developments continue to drive dislocation in a variety of industries. Location-aware mobile devices, cloud computing, and the emerging “Internet of Things” open up many new product possibilities—most of which will benefit society, both by reducing risks and by improving risk monitoring and management. The dynamic start-up ecosystem has fully embraced the new technological possibilities and companies are now aiming to bring a variety of new risk-aware products to market.
Autonomous vehicles—including driverless cars—are perhaps the ultimate technological challenge, and represent a significant threat to the insurance industry specifically. As we discussed in 2014, motor insurance provides 47 percent of global property-casualty premium, and generally provides a capital ballast to other lines. We estimate insurers’ loss ratio volatility in the US would increase by 40 percent if motor lines were removed from the results. Driverless cars have the potential to increase insurance costs across all other lines of business if they effectively remove the implicit capital subsidy that stable motor results provide the industry.

Yet for the insurance industry, these risks also present opportunities for growth if the right combination of capital plus data and analytics can be brought to bear. Even autonomous vehicles may have an insurance upside, as the decline in personal motor premiums could be partially offset by a rise in premiums for the car manufacturers and the technology companies on whose networks the driverless vehicles operate.

In the following pages we survey a number of the forces driving the changing landscape of risk:

- Autonomous vehicles
- Cyber risk
- Brexit and its economic implications
- Differences in global homeowners policies
- Growing insurance participation through takaful, or Sharia-compliant insurance
- Insurance industry reserve adequacy

Product excellence is paramount in today’s economy, with superior solutions able to grow to scale in a matter of years or months. A core aspect of product excellence is the customer interface, and we see both a product battle and a customer-control battle quite clearly in the insurance startup universe. Control of the customer is a fragile link in the face of a clearly superior product, a lesson clearly made by other industries that have been disrupted.

The younger generations have expectations for service, choice, and ease of doing business calibrated to the very best online service experiences—levels against which insurers find it very difficult to compete.
Autonomous Vehicles: Implications for Insurance

There is a lot of excitement about the future of self-driving technology and autonomous vehicles. What are the implications for the future?

We have stated earlier that personal motor accounts for 47 percent of global insurance premium—without this ballast and implicit capital subsidy, we estimate that US property-casualty insurance volatility would increase by 40 percent. But of course, this would not happen all at once, and we do not anticipate that personal motor premium will ever go away completely. So let’s dig in a bit further.

Research from experts in the field suggests that in an autonomous vehicle world, accident frequency will decrease sharply while severity increases modestly:

- Claims frequency is expected to fall, as experts predict connected car technology will address 81 percent of all vehicle crashes, saving many of the 1.2 million lives lost in car accidents and hundreds of billions of dollars of economic losses each year.

- Severity is likely to rise because of the increased sensor costs on autonomous vehicles; current designs put these sensors on vehicle bumpers, which means they would be the first to get damaged in the event of an accident.

- Severity will also increase because of the increased cost of handling product liability claims, if we assume that accident liability will shift from the vehicle driver today to the future operator of the autonomous vehicle fleet.

Collectively, these changes will reduce pure premiums and put pressure on the insurance market to replace revenue.

Quantifying the Impact

With the first commercially-available technology predicted for 2018 a final question remains: how quickly will self-driving technologies be adopted by consumers? Here, we look to history for guidance. Cars took approximately 80 years from the date of first commercial availability to reach 90 percent adoption, air travel took approximately 60 years, mobile phones 30 years while smart phones have taken only 10 years.

Here, we take a middle-of-the-road approach—30 years to reach full adoption—which is consistent with the historical propagation of safety features in personal vehicles. We also assume an 81 percent reduction in frequency, an increase in severity due to sensor costs, and increased cost of handling product liability claims.

With these assumptions, we can project the proportion of cars on the road that will be self-driving, as well as the impact to pure premium. The chart illustrates our findings. At this pace of adoption, industry pure premiums will fall 20 percent below their 2015 levels by the year 2035, and fall by more than 40 percent by the time that autonomous vehicles reach full adoption by 2050.

Adoption will of course be affected by many variables—such as regulatory challenges, cost to the consumer, safety, vehicle ownership preferences, and the technology itself—and may occur faster or slower than what we have modeled here.

Note though that this chart masks a more significant industry shift as premium moves from the personal motor insurer to the commercial fleet insurer. Diversified multi-line insurers will likely be able to take this change in stride, as premium shifts from one business unit to another. Personal lines-concentrated insurers may have a greater challenge to replace their premium base, will likely see greater volatility in overall performance, and may require changes in strategy in order to adapt successfully to an autonomous vehicle world.

Autonomous Vehicle Adoption and Impact on Insurance Premium

![Graph showing the proportion of autonomous vehicles and industry pure premium](chart.png)
The idea of autonomous vehicles—commonly known as driverless cars—still seemed like science fiction only a few years ago, and yet the technology just may be moving from imagination to reality. And far sooner than many would have believed.

In such a dynamic industry, the misconceptions about the technology, its impact, and the nature of innovation can open a host of questions, not least the effect this technology may have on the automobile industry. But what are the implications for those of us in insurance?

Aon Benfield’s COO of Analytics, Tracy Hatlestad, who is based in Singapore, talks with nuTonomy’s Chief Operating Officer, Doug Parker, about the future of autonomous vehicles, the impact the technology may have on insurance, the driverless vehicle trial which kicked off in August 2016, closely followed by the expected launch of the driverless vehicle fleet in Singapore as soon as 2018.

Q: How will autonomous vehicle technology impact us in the future?
That’s a great question and frankly, I think if you’ve just bought a car, you won’t need to buy another one in your lifetime. That’s a very profound statement, but I think it’s true. Most of us will not need our own personal vehicles because of the ease, comfort, and cost-effectiveness of alternative ways to move from point A to point B. Within a generation, we will be thinking about automobiles in a different way. Anyone who recently sat in a barely moving car in downtown London or New York will have likely thought… there has to be a better way.

The technology is going to arrive in the next 10 years rapidly, and across multiple fronts. People across the world are already talking about developments in the electrification of cars, connectivity, active safety infrastructure, and infotainment. We’re focusing on the autonomous aspect of transportation and we see it growing in the “mobility on demand” applications first. Taxis, for example.

We expect to launch our self-driving mobility-on-demand service in Singapore in 2018. Within 20 years, our vehicles will be available, broadly, across the globe.

Q: Why will “mobility on demand” or taxi replacement be the first way that most consumers will interact with autonomous vehicle technology?
Two simple reasons:
It is the practical first step. The technology challenges can be constrained. Unlike private cars that can be driven anywhere, and have any driver behaving in complex ways, we can control where the autonomous vehicles in our fleet operate. We can constrain our problem and this is really important for new complex innovations.

Next, the economics are compelling. Replacing the driver in a taxi yields real value. The use of private vehicles that are utilized only 10 percent of the time will no longer make sense.

I don’t think most people will want to buy cars after the widespread adoption of mobility on demand. It will be insanely inexpensive to use this type of service and I think the typical car owner will make the decision to spend money on mobility and not on a hunk of metal sitting in a garage most of the time. In the future, I think people will wonder why we even allowed people, in the not too distant past, to drive around in two ton metal boxes at speeds of 60+ miles per hour.
**Why Singapore?**

A: We’re watching around 20+ markets carefully, and we’ve got a list of locations throughout the globe that we’re considering. Singapore is the obvious first city to launch our new service in, however. It’s tech-ready; the talent is here; there’s positive regulation for autonomous cars; and the roads are easy for our technology to learn on. We recently launched a public pilot of our technology within a limited service area in Singapore. This pilot is going to allow us to collect technical data, but equally importantly, it’s going to allow us to find out if people enjoy riding in driverless cars.

**What do you think about the insurance implications of your business? How should liability be managed?**

I don’t think this is going to be left to individuals in the long run. I think the liability will sit with the service operators. This will evolve away from a personal lines model because, largely, autonomous cars will predominantly be fleet cars, and therefore insured as fleets.

If we think back to mobility on demand, it’s a combination of the vehicle that’s provided and the coordinating, or sharing, company who’ll manage how it’s utilized. The sum of the two is mobility on demand.

**What is the role of the auto manufacturers in the development of this technology?**

As little as six months ago, I’d say the original equipment manufacturers (OEMs) had a very different view of how things would develop. They would have said it’s about personal cars, but I think every OEM we’ve talked to has really changed their mind. They’ve seen the fleet element of this developing—the autonomous taxi service—and seen the importance.

What’s interesting is that they maintained that the technology would be years away—some even saying 2030. Today, I think they’ve gotten on the sharing economy bandwagon—GM bought Cruise and Lyft; VW in Get; and Mercedes with car2go and MyTaxi, so the largest companies are seeing the need for this.

Even traditional tech players are interested. Apple, for example, is investing in DiDi Chuxing in China—everyone is understanding the need for autonomous vehicle technology.

"I think if you've just bought a car, you won't need to buy another one in your lifetime."

Doug Parker
What do you think about commercial vehicles?
There’s a lot of strong economics for trucking in the same way there is for autonomous taxis. First, let’s consider the benefits of autonomous taxis. It’s not only that it’s less expensive, it’s also more comfortable, more reliable, more customizable—the way you’ll be able to book taxis also means you’ll be able to potentially select your own music, temperature, etc. That’s what we want to help create at nuTonomy with autonomous taxis; to make the transportation experience so much better.

I think we can see similar benefits for trucking. There’s a lot of additional benefits other than taking the driver out of the vehicle. One US-based company is looking at platooning, where you save a lot of fuel with the trucks driving closer together. In Singapore, we’re exploring how autonomous trucks can be out there on the roads at night and freeing up the roads during the day.

The other plus point is the safety of the technology. Trucks are a lot heavier than personal cars and the safety factor is not trivial. I think we will see a lot of developments on the trucking side in the coming months and years.

There have been recent, high visibility, accidents involving autonomous driving technology; what do you think are the implications for the development of this tech?
It’s a great question. Ultimately, it has refocused us all to redouble our efforts on safety. It was always incredibly important, but now it is absolutely critical. As it should be. When the facts are all out, I’m confident that we will see that this new technology will save lives. In the long run, we’ll need to balance the inevitable accident with the larger benefits to society, and that’s one of the places where I hope the insurance industry can help us understand the risks, the economics, and the social and policy implications.

About Doug Parker
Based in Singapore, Doug Parker is the Chief Operating Officer for nuTonomy—a Cambridge, MA-based, VC-backed new venture. He joined the firm in 2015 and leads the company’s operations and finance globally. To date, the firm has raised in excess of USD 20 million, including a USD 16 million Series A funding that was led by Highland Capital Partners and included investment from Fontinalis Partners, Signal Ventures, Samsung Ventures, and EDBI, the dedicated corporate investment arm of the Singapore Economic Development Board.

Before joining nuTonomy, Doug was an Associate Partner at McKinsey & Company in the product development and private equity practices.

Doug earned MBA in Finance from the INSEAD.

About nuTonomy
Founded in 2013, nuTonomy is a leading developer of state-of-the-art software systems for self-driving vehicles founded by two world-renowned experts in robotics and intelligent vehicle technology, Drs. Karl Iagnemma and Emilio Frazzoli of MIT. nuTonomy is developing the first-of-its-kind complete solution for providing point-to-point mobility via large fleets of autonomous vehicles; this includes software for autonomous vehicle navigation in urban environments, smartphone-based ride hailing, fleet routing and management, and controlling a vehicle remotely through teleoperation.
Global Insurance Market Opportunities

One thing that the last few years have made clear: cyber risk is not simply an IT issue. It is an enterprise issue—a lesson not lost on the former executives of some noteworthy companies that have suffered data breaches. This means that numerous stakeholders bear responsibility for protecting the organization and its customers, including the board of directors, the CEO, Finance, HR, and the CIO or CTO as well as the corporate risk manager. Working together in a coordinated way, organizations can make themselves increasingly cyber resilient. Not working together, the costs can be high. The insurance industry has an opportunity to play a big role in helping businesses address this emerging and seemingly omnipresent risk.

The Opportunity and the Pain
The cost of cybercrime to the global economy is enormous, and expected to rise significantly higher. According to a McAfee 2013 report, cybercrime costs the global economy USD 445 billion each year. A new report from the Global Council on Internet Governance estimates that cybercrime could grow as high as USD 2 to 3 trillion by 2020: on par with the GDP of a top 10 economy!

Recent news articles have illustrated just how wide the impacts of cybercrime can be: hospital systems held for ransom, government officials’ contact information leaked online, Bangladeshi funds stolen from the Federal Reserve...the stories are familiar and constantly changing. Businesses want to know what to do about it.

If the pain is real, so is the opportunity for insurers. Cyber insurance premiums have grown from USD 600 million in 2010 to roughly USD 2 billion in 2015, at annual growth rates of 30 to 40 percent. Expectations for growth through 2020 are similar, which would bring global premiums to USD 10 billion—at least as large as the D&O market. These growth estimates are driven by future growth in the Internet of Things, as well as increased take up of cyber insurance coverage, which to date remains low at around 16 percent of companies.

Last year we made the distinction between cyber-as-a-product and cyber-as-a-peril: this gap is slowly narrowing. Coverage for physical damage from cyber attacks is beginning to be insured on some cyber policies. And other potential coverages might be further off in the future: roughly 50 percent of the annual cost of cybercrime is from theft of intellectual property, which currently presents a design challenge for insurers. Needless to say, the cyber insurance industry has plenty of room for expansion.

Moving Toward a Common Legal Environment
To date, the cyber market has been largely focused on US business—about 90 percent of the total by our estimates. As a result, policies are primarily designed to deal with third party liability risk—a concern that is not as pertinent to a large proportion of the world. And an overreliance on US policies has hindered the capacity of the market to grow as some insurers view the concentration of risk in the US as a potential aggregation risk and look to diversify elsewhere.

“Cyber is a distributed problem that requires an integrated solution.”
Greg Case, CEO, Aon plc

Cyber Insurance: Global Gross Written Premium (USD Millions)
This US-centricity is poised to change. The announcement by the European Parliament of the ratification of the General Data Protection Regulation (GDPR) in April 2016 should represent a sea change in the European cyber insurance market. The policy comes into force in May 2018 and addresses some of the current shortcomings of the EU legal framework on cyber risk, creating a common set of procedures, requirements and, importantly, sanctions. The GDPR applies to all corporations that handle EU citizens’ data—not just European organizations—which broadens its scope considerably. Failure to abide by the GDPR, which requires immediate reporting of data breaches upon discovery, can lead to corporation fines of up to 4 percent of worldwide annual turnover.

The development of a standardized framework should provide insurers with an excellent opportunity to engage European clients to diversify their cyber portfolios. Clients will be looking to engage with insurers and brokers to provide comprehensive coverage to avoid falling foul of the GDPR.

Growing Pressure to Quantify Cyber Risk
Along with changes to the legal environment, a number of readers will be well aware that regulators have been taking a close look at the cyber insurance market. At the forefront of this effort has been Lloyd’s. The Lloyd’s market has seen significant growth in standalone cyber premium of more than 45 percent year-on-year since 2012, and as a result has taken great interest in the amount of cyber risk that each syndicate is holding.

In August 2016 Lloyd’s released a list of eight scenarios that it wants every syndicate to model as part of their general reporting requirements. What is striking is that Lloyd’s has not focused specifically on the standalone cyber products; rather, the Lloyd’s scenarios appear far more concerned with what they call silent cyber exposure or exposure trapped within property, marine, or liability policies that do not explicitly exclude cyber. Cyber can be a major concern across all lines of business. All classes of business must have a basic understanding of this risk in order to avoid significant aggregations.

An Integrated Analytics Approach
On the modeling side, Aon has developed a pair of solutions to address cyber risk quantification concerns. For commercial enterprises, Cyber Insight is an analytics model designed to help businesses understand their cyber exposure and make informed decisions regarding cyber insurance purchase. For insurers, Aon Benfield has developed CyberMetrica—a probabilistic model for the cyber aggregation risk in an underwriting portfolio, built on our ReMetrica® platform. CyberMetrica draws on a number of data sources, including the quantified systemic risk parameters in this study, to provide insurers with a result distribution including mean underwriting results as well as results at all return periods.

Taken together, these tools can help an insurer understand their enterprise exposure to cyber risk, from underwriting to operations.
Brexit: The Road Ahead

While the polls predicted it would be a close call, few believed that the UK referendum to leave the EU would go the way it did. Since 1979, the British electorate has voted based on economic imperatives. Brexit broke the mold.

The outcome of the vote has led to a climate of economic and political uncertainty across Europe. The IMF has reduced growth forecasts for the UK and EU; the potential for further divisions in Europe and protracted and potentially fractious negotiations on the UK’s future relationship with the bloc will inevitably create further headwinds.

Regulatory or legislative change was identified as Number 3 out of 53 risks affecting organizations, according to the Aon 2015 Global Risk Management Survey. In Brexit we have a live example of how this risk plays out. For businesses operating in the UK and EU, the referendum has created unexpected volatility, with numerous aspects of the UK’s future relationship with the EU subject to change between now and Brexit. Organizations will need to remain focused on driving long-term value without finding themselves distracted or derailed by evolving political discussions.

Signals from the City of London are nevertheless encouraging. Institutions such as Lloyd’s and the London Market Group have reiterated their commitment to the global market, even as the free access that underpins London’s position may change.

The City and the Mayor of London have expressed a shared desire to keep passporting rights that enable insurers to operate throughout the European Economic Area. Signals from European capitals suggest otherwise, but it is apparent that solutions to the issue for those most affected—Lloyd’s and certain UK insurers being chief among them—are already being pursued.

Organizations will still need to consider what Brexit may mean for pan-European business strategies, the servicing of accounts, and carrier operational profiles. Greater weight may be given to European operations as a result of Brexit, although the diversification strategies pursued by carriers in recent years will limit the impact of an end to the UK’s unfettered access to the single market.

What is apparent is that in the immediate-term it will be business as usual for the insurance industry. Global distribution networks, existing centers of specialty knowledge and talent, and an inherent conservatism, will likely mean limited change to the broader insurance landscape as a result of the referendum.

As the terms of Brexit solidify, there is potential for more significant changes to the market—particularly for London—but all current signals suggest a limited and cautious adaptation, rather than any dramatic evolution. More worrying, perhaps, is the possibility that Brexit will be merely the first legislative act in a wave of economic nationalism around the world—we fear that such a wave would seriously constrain the economic and social mobility that we have grown accustomed to enjoying throughout these past decades of growth.
Homeowners Coverage around the World

One way to approach product development is to bridge successful ideas from one territory into others. Homeowners insurance—or alternatively household or personal property insurance—is offered in every country we track in this study, but the scope of coverage varies meaningfully across countries. What one country considers a standard part of the product offering, another country may exclude.

From a client perspective, omissions from the standard homeowners policy make the insurance buying process increasingly complex and add to confusion about the product when a particular peril is simply not covered.

Insurers, from their perspective, may omit certain coverages in order to manage their risk—for example, by excluding damage from floods or earthquakes in geographic areas that are at significant risk of those perils. Typically, this coverage is then offered under a separate policy, either separately priced by the insurer or offered by a government scheme.

As an illustration, below we examined the standard homeowners policies of the top three countries in each region across five coverage areas of interest: flood, earthquake, warranty, mobile phones, and drone liability. The results are indicated with a green-amber-red coloring. Here, “Green” means that coverage is included as standard on the country’s policy. “Amber” means coverage may be offered by endorsement, or with restrictions. “Red” means coverage is generally not offered on the standard policy, but may be offered as a separate product.

<table>
<thead>
<tr>
<th>Coverages</th>
<th>Americas</th>
<th>EMEA</th>
<th>APAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood</td>
<td>Brazil</td>
<td>France</td>
<td>Australia</td>
</tr>
<tr>
<td>Earthquake</td>
<td>Canada</td>
<td>Germany</td>
<td>China</td>
</tr>
<tr>
<td>Warranty</td>
<td>US</td>
<td>UK</td>
<td>Japan</td>
</tr>
<tr>
<td>Mobile Devices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drones</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results show meaningful variation in homeowners coverage across the major economies. Take flood coverage as an example: in the US it is clearly excluded, being offered separately through the National Flood Insurance Program. Japan, France, and the UK offer coverage as part of the standard policy, although it can be expensive for some buyers. Germany offers flood coverage by endorsement, and in China it is standard but only outside of the flood hazard areas. Earthquake coverage is similarly varied. Newer coverages, such as drone liability and mobile phone protection, are not standard yet in any of these countries, although in some places these are granted with limitations.

As an illustration, below we examined the standard homeowners policies of the top three countries in each region across five coverage areas of interest: flood, earthquake, warranty, mobile phones, and drone liability. The results are indicated with a green-amber-red coloring. Here, “Green” means that coverage is included as standard on the country’s policy. “Amber” means coverage may be offered by endorsement, or with restrictions. “Red” means coverage is generally not offered on the standard policy, but may be offered as a separate product.

The one coverage that these countries generally agree in excluding is warranty coverage for home goods. Extended warranties are often dismissed by consumer groups as a waste of money. Could insurers do better by providing this coverage within the homeowners policy?

In the Perspectives section, we explore further ways for insurers to expand beyond their traditional areas of business.
Takaful–Opportunities and Challenges

Takaful is a form of insurance that is compliant with Islamic law. It is growing rapidly in the Middle East and Asia, notably in countries where insurance has not played a significant role in the economy to date.

**How Takaful Works**

Takaful is an Arabic term derived from the verb “kafala” that means to mutually guarantee and protect one another. Takaful embraces a concept of risk sharing in which policyholders contribute funds to a common pool managed by an operating company—the funds are then used to help parties involved in the event of a loss of life, health, or property. Any fund surplus is returned to the policyholders, unlike with conventional insurance. In addition, takaful operators do not participate in interest-based activities, and investments are made only in Sharia-compliant securities.

**Global Takaful Market**

Global takaful contributions have been growing 14 percent annually and are forecast to reach USD 20 billion in 2017, according to Ernst & Young. Saudi Arabia makes up 48 percent of the global contributions and ASEAN countries (mainly Malaysia and Indonesia) account for another 30 percent. Personal lines dominate the typical takaful portfolio. In 2015, Saudi Arabia had 81 percent of its business in health and motor lines. Similarly in Malaysia, motor takaful accounts for 62 percent of general takaful business.

The takaful market is currently facing challenges that may constrain growth in the future. Middle Eastern economies have been significantly affected by the dramatic fall in oil prices, resulting in cutbacks to previously generous fuel and food subsidies, introduction of new taxes, and removal of social benefits. Malaysia has been significantly impacted, with currency levels below those seen in the aftermath of the 1990s ASEAN financial crisis.

Takaful operators are also dealing with high operating costs, inefficient claims processes, high combined ratios, and a slow pace of technology adoption for sales and marketing strategies. Consolidation is expected as smaller players are expected to face higher operating costs and capital requirements. The benefits of Sharia compliance need to be matched with the delivery of a superior client experience to compete effectively with conventional equivalents.

**Regulatory Impacts**

The regulatory landscape in the Middle East, Malaysia, and Indonesia has evolved to provide a strong foundation for the industry. Islamic bank and government initiatives are providing further impetus for takaful growth. Islamic banks are beginning to insist takaful cover be purchased to support project financing. The Malaysian government requires (re)takaful coverage for a number of initiatives—for example, a takaful plan for a low income household and agricultural scheme is planned by 2017. Indonesia’s Financial Services Authority is considering introducing a legal framework this year for the establishment of Islamic real estate investment trusts to fulfill the medium term investment needs of takaful operators.

**Global Retakaful Market**

Smaller takaful operators typically partner with retakaful brokers and operators for technical expertise, product development, and tools for pricing and exposure management. Low volatility personal lines portfolios do not require much retakaful capacity, but proportional retakaful capacity is commonly used to manage commercial portfolios. Given the low penetration in commercial business lines, retakaful operators have adopted multi-territory funds instead of country, company, or class specific ones in order to manage volatility.

Takaful operators have to date had limited appetite for large commercial business due to a lack of technical expertise and retakaful capacity. London-based Cobalt Underwriting launched a Sharia-compliant platform in 2012 specifically for underwriting large commercial risks. In Malaysia, the industry is exploring a retakaful pool to address the lack of capacity and expertise.

**Conclusion**

Global takaful contributions are expected to maintain strong growth, driven by government initiatives and the strength of the Islamic banking sector. But given the economic climate and known structural challenges faced by takaful operators, Aon Benfield makes a more conservative forecast of growth than other sources, with global takaful contributions projected to reach USD 20 billion in 2019. Given the growth challenges, innovations to participate in this niche but growing segment deserve attention.
US Reserve Adequacy and the Link to the Underwriting Cycle

In 2015, the US property casualty industry experienced its tenth consecutive year of loss reserve releases, with USD 7.3 billion in favorable development booked. On the surface this headline may sound like “more of the same,” but the story is more nuanced. This is the smallest reserve release for the industry since 2006, and the percentage of companies experiencing adverse development is increasing. Might these be signals that insurers’ financial positions are substantially weakening? And might this herald the long-awaited conclusion to the current soft market? Let us take a deeper look.

We can form an independent opinion about the adequacy of statutory reserves using the high quality, uniform data at the legal entity available through the NAIC Schedule P in statutory accounts. The accounts provide US regulators with a clear view into insurance companies and are part of a very effective system of solvency regulation based on consistent and transparent reporting.

Seven years ago, Aon Benfield started publicly tracking the reported reserve adequacy of US companies. Each year we analyze the aggregated net loss development data by Schedule P line of business.

Working at an aggregate level allows our actuaries to use different methods and to weigh the results in different ways compared to those working with smaller and less stable data sets. Compared to public studies, our reports have called for continued reserve releases by the industry—predictions that have been borne out by subsequent facts.

The table below summarizes the analysis of the year end 2015 data. The overall industry redundancy position decreased to USD 4.8 billion at year end 2015—equivalent to only 0.8 percent of total booked reserves. This compares to an USD 6.3 billion total industry redundancy position at year end 2014. Commercial lines continue to show an aggregate reserve deficiency of nearly USD 2 billion, but the biggest move in the aggregate reserve adequacy position was in personal lines where the projected redundancy dropped to USD 6.5 billion at year end 2015 from USD 8.3 billion.

With reduced equity in reserves going forward, mistakes made by insurers in underwriting, rate monitoring, and primary pricing will no longer be masked by a reserve cushion.

As we have discussed in past editions of this study, understanding reserve risk is critical for effectively modeling company solvency and monitoring the phases of the underwriting cycle.

### US Reserve Estimated Adequacy and Loss Development Summary (USD billions)

<table>
<thead>
<tr>
<th>Line</th>
<th>Estimated reserves</th>
<th>Booked reserves</th>
<th>Remaining redundancy at YE 2015</th>
<th>Favorable or (adverse) development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2011</td>
</tr>
<tr>
<td>Personal Lines</td>
<td>140.2</td>
<td>146.7</td>
<td>6.5</td>
<td>7.6</td>
</tr>
<tr>
<td>Commercial Lines</td>
<td>440.9</td>
<td>439.1</td>
<td>(1.8)</td>
<td>5.1</td>
</tr>
<tr>
<td>Commercial Property</td>
<td>41.2</td>
<td>42.8</td>
<td>1.5</td>
<td>1.4</td>
</tr>
<tr>
<td>Commercial Liability</td>
<td>237.6</td>
<td>234.9</td>
<td>(2.7)</td>
<td>4.1</td>
</tr>
<tr>
<td>Workers Compensation</td>
<td>148.5</td>
<td>148.2</td>
<td>(0.3)</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Financial Guaranty</td>
<td>13.5</td>
<td>13.3</td>
<td>(0.3)</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Total</td>
<td>581.1</td>
<td>585.8</td>
<td>4.8</td>
<td>12.7</td>
</tr>
</tbody>
</table>
Looking back through history, a graph of the US property casualty premium relative to GDP is a quick visual demonstration of the underwriting cycle. Since 1968, the industry has had three major hard market turns of significant premium increases, across multiple calendar years.

All three steep increases in the premium-to-GDP line have been led by significant loss-to-GDP increases. Since “Schedule P” was introduced in the mid 1980's, we have detailed information regarding the movement in prior year loss reserves for the last two hard market turns in the underwriting cycle, highlighted in gray. In both of these instances, loss to GDP increased substantially over a three-to-four year period, preceding the premium to GDP movement each time by one year. By contrast, a single year of large cat losses does not cause a hard market – we note the absence of hard market conditions following Hurricane Andrew in 1992 and Katrina in 2005.

Evaluating the information more granularly, we can see the link even more clearly. If we look at the commercial auto liability line on the next page, the top chart on the next page shows the difference between accident year ultimate loss ratio picks at the initial estimate (gold line) and the final estimate 10 years later (blue line). Accident years that were initially under-reserved show a difference between the two lines in red and accident years that were initially conservatively reserved show up as the green differences between lines.

As shown, sequential initial accident year under-estimation of ultimate losses and reserves, leads to future calendar year adverse development. This calendar year reserve development can then align with corresponding premium growth. The percentage change in market premium levels is highly correlated to the changes in reserve development, and in particular, the large increases in premiums associated with the hard market align with the large increases in calendar year loss development.

This illustration highlights three key points.
1. Accident year reserve inadequacy is a leading indicator for an underwriting cycle turn to a hard market.
2. A single year view of reserve risk understates the cumulative impact of volatility. The movement in reserves across time is clearly correlated.
3. Premium will increase at the same time reserves will be increasing.

If a company tries to maintain market share across time, then at the turn of an underwriting cycle it will see reserve increases erode surplus at the same time that premiums will be increasing. Given that both risk-based capital and rating agency solvency models are factor based models driven by reserve and premium balances, the company will then see its required capital increase at the same time that its surplus is decreasing.
The commercial auto liability line has entered the adverse reserve development portion of the cycle, and in the past, the risk of adverse development has emerged first in commercial auto before emerging in other casualty lines. As companies look to enhance the robustness of their Own Risk Solvency Assessment process, creating a realistic, multi-year underwriting cycle scenario, understanding both their individual exposure as well as their relative exposure to the macro market dynamics is critical to assess capital adequacy across a multi-year time horizon.

**Commercial Auto Liability**

**P&C Industry Accident Year Loss Ratio @ 12 mos. vs. Current Estimate**

Aon Benfield Analytics has developed effective models of industry loss drivers, as well as a realistic underwriting cycle stress scenario based on by line of business movements across the last two hard market turns. While in the current environment insurers have been focused on growth and innovation, it is always important for companies to manage their overall financial position with an understanding of the potential risks of a turn in the market. Only with that understanding can the growth and innovation agendas be placed on solid footing and executed successfully.
The world is changing at an unprecedented rate. Cities are growing faster than the population overall, which will be beneficial to commerce and stimulate economic development, but at the same time increase the concentration of insurance risk, particularly in coastal areas.

At the same time, connectivity is on the rise, driven by mobile phone usage and Internet connectivity. The “internet population” will surpass the urban population in the next five years. With connectivity, expectations of customer experience and responsiveness will continue to evolve.

While the connected human population will continue to grow, it will be vastly outnumbered by the connected machine population—perhaps the biggest change happening behind the scenes. Cyber risk will continue to increase as the number of exposures increase—as well as the number of devices that can be marshalled in cyber attacks.
Section 3

Capital
In last year’s study, we discussed the concept of “Uberization” and its various definitions. One definition—relevant to the insurance industry—is the introduction of increased supply competition. As Uber Technologies stimulated driver supply during peak-demand periods through the use of “surge pricing,” so has the influx of alternative capital been disrupting the insurance and reinsurance markets in myriad ways. Alternative capital in the industry now stands at a record USD 75.1 billion, with an outsized effect on catastrophe risk pricing. Aon Benfield projects that this will rise to USD 100 to 125 billion in several years’ time. We also expect a continuation of the favorable pricing trends for reinsurance buyers, discussed further in Aon Benfield’s 2016 Reinsurance Market Outlook. Softening reinsurance pricing stimulates increased price competition in the insurance markets from (re)insurers seeking top line growth.

Another definition of Uberization—this one from Nassim Nicholas Taleb—is the elimination of intermediaries. In a world where information and capital flow freely, and distribution to customers is becoming more and more immediate, product excellence becomes paramount. Where products are shown to be lacking, the powers of information and capital will carve new, more efficient pathways.

What doors has the insurance industry left open for new players to enter? A good place to search is by looking at expenses for the industry. As previously noted, there are five primary groups in the insurance value chain: customer, paper, claims, investments, and capital. How do insurers currently expend resources against this value chain? In the US, we can find answers by looking at statutory financial statements.

<table>
<thead>
<tr>
<th>Link in Value Chain</th>
<th>Examples of Expense Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Broker and agent commissions, advertising</td>
</tr>
<tr>
<td>Paper</td>
<td>Underwriting, bureaus and associations, licenses and fees</td>
</tr>
<tr>
<td>Claims</td>
<td>All claims adjustment services, related IT expenses</td>
</tr>
<tr>
<td>Investments</td>
<td>Costs of trading, advice and management</td>
</tr>
<tr>
<td>Capital</td>
<td>Expected cost of capital</td>
</tr>
</tbody>
</table>

The table on the next page highlights the major expense drivers in each link of the value chain. Note that we are taking a customer-centric perspective on insurance expenses. Claims adjustment services are usually considered part of the insurer’s loss ratio, not the expense ratio—here we include them with expenses since they are not dollars that are ultimately paid to the client.

The cost of capital is less well-defined than the other expenses here. This analysis compares the weighted average cost of capital (WACC) of publicly traded insurers against an estimated WACC for mutual insurers, which we weighted by premiums resulting in an average cost of capital of 6.7 percent. Based on these assumptions, the next page shows a breakdown of expenditure for the US property-casualty industry.

Perhaps the thing that stands out from this analysis is that insurers’ overall expense load is very high—just under 50 percent of premium. Put another way, the industry is only paying out 50 cents in claims payments for each dollar of premium collected. By comparison, the Affordable Care Act requires health insurers to spend at least 80 to 85 percent of premium dollars on medical care. If a health insurer fails to meet its applicable minimum loss ratio for a given year, it will be required to provide a rebate to its customers.
Where are the potential weak links in the insurance value chain?

Expenses Across the Value Chain, 2015 (USD millions)

<table>
<thead>
<tr>
<th>Value Chain Link</th>
<th>Customer</th>
<th>Paper</th>
<th>Claims</th>
<th>Investments</th>
<th>Capital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Expense Dollars</td>
<td>95,910.6</td>
<td>48,965.6</td>
<td>60,523.5</td>
<td>3,385.4</td>
<td>45,508.9</td>
<td>254,294.0</td>
</tr>
<tr>
<td>Percent of total expenses</td>
<td>37.7%</td>
<td>19.3%</td>
<td>23.8%</td>
<td>1.3%</td>
<td>17.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Percent of net earned premium</td>
<td>18.7%</td>
<td>9.6%</td>
<td>11.8%</td>
<td>0.7%</td>
<td>8.9%</td>
<td>49.7%</td>
</tr>
</tbody>
</table>

**Customer**

Insurers spend the most on the customer link of the value chain—over one-third of the total. It is no surprise that a majority of startups are targeting this link, particularly in the personal lines and small commercial lines segments of the market. This is a classic opportunity for disruption, where lower-need customers could be served more cheaply and efficiently with streamlined solutions. Customers in this segment demand greater price transparency, simpler coverage construction, and a more straightforward application process. Start-ups aim to deliver on all of these desires. The insurance industry is also moving toward services designed for these customers, through the direct distribution model.

For more complex customers, the risk assessment and risk management needs increase substantially—particularly in commercial lines—and thus the demand for comprehensive and customized service increases as well.

**Claims**

Claims servicing costs make up nearly one-fourth of total expenses. Claims servicing is an important part of the insurance product, especially for third party claims. These services are complex and highly engineered.

There are frequent opportunities to fine-tune the claims process to ensure that more complex claims are handled by more experienced adjustors, understand pain points in the process that might create a negative claim outcome, and help remove fraud and waste from the system. On page 40, we discuss the services that Aon’s Inpoint Claims team offer for clients looking at these issues.

**Capital**

Capital costs almost 20 percent of total expenses. Capital stands behind the critical risk-bearing and risk-transferring function of insurance—in many ways it “is” the product. We have discussed the alternative capital revolution in previous editions of the study—it is an area where the industry has embraced many new innovations over the last 25 years. And over that time period we have seen substantially lower costs for risk-bearing capital, leading to lower costs for insurance and reinsurance buyers—led by the decreases in property catastrophe reinsurance.

**Paper**

Paper also costs almost 20 percent of total expenses—in fact it costs more than capital! Paper represents the one service the insurance industry provides that cannot be replicated elsewhere, albeit one whose protections are created by regulation. Insurance regulation helps ensure that the promise to pay will be honored when claims are due, and generally around the world has functioned effectively. Unlike banking, where there is regulatory arbitrage within so-called “shadow banks,” insurance regulation has been more fit-for-purpose and has not led to significant “shadow” operations.

From a customer’s perspective, the weak points of insurance often lie in the interaction across the different parts of the value chain. Potential innovations, such as just-in-time or partial time coverage, laser cover for specific articles, microinsurance products, and cyber coverage continue to emerge. Each must cross design hurdles around potential adverse selection, customer value, insurer pricing certainty, and coverage language.
Insurers and reinsurers looking for new areas of growth should look closely at an area that may sound surprising: mortgage. Mortgage was considered a bad word when joined with “subprime” during the Global Financial Crisis of 2008. But the mortgage opportunity we are speaking of today is different both categorically and fundamentally from the one of yesteryear; it is transparent, it is profitable, and it is growing.

Since the financial crisis, the US housing market has seen significant regulatory reform. The creation of the Federal Housing Finance Agency (FHFA) in 2012 ushered in a new regulator and conservator for the government sponsored entities (GSEs) Fannie Mae and Freddie Mac.

Shortly after the creation of FHFA, the GSEs were mandated to share their historically retained mortgage default risk with multiple forms of private capital. In response to this requirement both GSEs created insurance products to complement their capital market credit risk transfer (CRT) products. Freddie Mac created Agency Credit Insurance Structure (ACIS®) and Fannie Mae created Credit Insurance Risk Transfer (CIRT™). Both programs share credit default risk on an aggregate excess of loss basis.

The GSEs have historically been required to have private mortgage insurance on all loans delivered to them with loan to value (LTV) ratios greater than 80 percent. In order to ensure consistent standards of strength from their mortgage insurance counterparties, the GSEs finalized their Private Mortgage Insurance Eligibility Requirements (PMIERs) in 2015. In response to PMIERs and a concrete capital standard, many mortgage insurers have turned to reinsurance as part of their capital base. As of mid-2016, four of the seven total mortgage insurers have announced using reinsurance as part of their capital structure post-PMIERs.

The combination of GSE credit risk transfer and mortgage insurer reinsurance purchases have led to a material demand for mortgage default risk transfer insurance products over the past few years. We expect future demand for this class of business to remain strong.

**Sizing the Market**

In order to quantify this emerging opportunity for the insurance industry, we begin with the size of the standard US mortgage market which, since the Great Recession, has averaged approximately USD 1.5 trillion in newly originated loan balances per year.

Not all US mortgages are securitized (approximately 50 percent are) by Freddie Mac and Fannie Mae. Since CRT inception, the GSEs have mainly shared risk on 30-year fixed mortgages. Based on insurance purchasing patterns to date, we estimate that the GSEs may purchase USD 6 to 7 billion of reinsurance limit which, over time, could grow to USD 30 to 35 billion of in-force credit default risk exposure and generate USD 1.5 to 2.0 billion of annual premium.

However, the total mortgage credit risk opportunity for the insurance industry is much bigger than the GSE opportunity alone. Of the USD 1.5 trillion in mortgage originations, approximately one-third is made up of high loan-to-value (above 80 percent) mortgages and about one-third of those loans end up being insured by private mortgage insurers. Using current mortgage insurance rates and expected policy lifetimes, we estimate that a single year of loans could generate USD 4 to 5 billion in industry mortgage insurance premiums. If 20 percent of that premium were to be shared with reinsurers through quota share arrangements, the run rate premium opportunity for mortgage insurance reinsurance could be as large as USD 1 billion annually.

Overall, GSE and mortgage insurer risk sharing could grow to generate USD 2.5 to 3 billion of annual premium, comparable in size to federal flood, earthquake, or warranty lines of business.
Opportunity for the Insurance Industry
Aon Benfield continues to help the GSEs and mortgage insurers mitigate their risk and supplement their capital base through reinsurance. We believe that mortgage credit risk represents a significant growth opportunity for reinsurers with attractive fundamentals.

Timeline of Mortgage Reinsurance Market Development

Fannie Mae

**Nov 1, 2014**
First Fannie deal completed, with three counterparties. USD 193 million in limits placed.

**Year-end 2015**
- 6 deals placed in 2015
- 8 participating counterparties
- USD 1.1 billion in limits placed

**Mid-year 2016**
- 6 deals placed so far in 2016
- 10 participating counterparties
- USD 1.2 billion in limits placed

**Nov 12, 2013**
First Freddie deal completed with one counterparty. USD 77 million in limits placed.

**Year-end 2014**
- 3 deals placed in 2014
- 8 participating counterparties
- USD 709 million in limits placed

**Year-end 2015**
- 10 deals placed in 2015.
- 15 participating counterparties
- USD 2.8 billion in limits placed

**Mid-year 2016**
- 6 deals placed so far in 2016
- 18 participating counterparties
- USD 1.8 billion in limits placed

Freddie Mac

USD7.7 billion in total limits placed since 2013
Opportunities in Investments

The management of investment portfolios is, along with underwriting and risk management, a mission critical endeavor for most insurers. Well designed investment strategies can enhance an insurer’s financial strength, which in turn sets the foundation for policyholder security and business expansion. The financial world is more complex than ever for insurance asset owners and, in our view, this is an opportune time for insurers of all types to take a fresh look at whether their investment strategies can meet these challenges.

The Challenges at Hand

In recent years, global insurers have faced investment challenges on an array of fronts. The post-financial crisis landscape has spawned greater regulatory oversight, additional governance demands and a heightened focus on risk management of insurance assets. Each of these trends will impact how investments are managed going forward. For example, the investment implications of The Solvency II Directive of the European Union (Solvency II), and the Own Risk and Solvency Assessment (ORSA) regimes elsewhere, are worth reviewing since they highlight the latest investment governance and risk management standards impacting global insurers. The table below provides examples of some of the investment processes addressed in Solvency II.

Investing involves balancing potential risks against potential returns, and while Solvency II and similar initiatives should help tighten the “risk” side of the investing equation, insurers are still left with the task of generating adequate returns in a period of extraordinarily low fixed-income yields. Producing returns on investments is a challenge facing all global insurers no matter the domicile.

Solvency II Investment Concepts

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prudent Person Principle</td>
<td>Ensure adequate diversification and quality of investments held for regulatory purposes</td>
</tr>
<tr>
<td>Asset-Liability Matching</td>
<td>Encourages greater asset liability matching and tighter asset-liability management (so as to avoid higher capital charges)</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Monitor investments and risks, including portfolio managed by external investment managers</td>
</tr>
<tr>
<td>Reporting</td>
<td>Increases the level of investment reporting</td>
</tr>
</tbody>
</table>

The graph below shows the steady decline in the yields for 10-year government bonds issued by Germany, Japan, US, and UK to levels less than half of where they were pre-2008, with Japan and Germany now in negative interest rate territory.

Since fixed-income securities are the most heavily used type of investment within insurance portfolios, ranging from 68 percent for property-casualty insurers to over 90 percent for life insurers, lower yields today are a significant headwind to insurance portfolio investment returns and bottom-line income.
How to Meet the Investment Challenges of Today and Tomorrow?

We have outlined three steps insurers should pursue to adapt to the forces at work in today’s investing environment.

Perform a Comprehensive Review of Investment Policies

The market and regulatory changes of the past few years makes this a good time, in our minds, to review long-term investment policies and investment strategies. Such a review would typically include confirming: return and risk expectations for investment portfolios; the needs of key internal and external stakeholders; business, domicile and other industry constraints. Changes to investment objectives and constraints of the organization, such as loss tolerance levels, liquidity and return needs may require adopting a new asset allocation strategy. We are proponents of using asset allocation and asset-liability studies to determine optimal investment portfolios relative to an insurer’s goals and constraints. Asset-liability studies are able to test solvency under extreme scenarios (e.g., 99.5 percent confidence levels) and also tease out the benefits of pursuing new investment strategies. Performing and documenting asset allocation and asset-liability risks is consistent with requirements of solvency assessment models.

Optimize Your Investment Structure

Optimizing a portfolio’s investment structure, i.e., how investment strategies are implemented, can lead to near immediate benefits. When optimizing investments, we have enjoyed a high success rate in ensuring proper investment diversification and in resetting investment expense arrangements so they are as competitive as possible. For example, we find that portfolios with investments limited to one country (e.g., home country bias) can often benefit by exposure to other markets, which may offer added yield and additional portfolio diversification without a sacrifice in investment quality.

Minimize Your Fee Agreements

Then there is perhaps the lowest hanging fruit in the investment industry—negotiating more favorable fee agreements with external investment managers. Lower investment expense drops directly to the bottom line and improves net investment yield. Success in negotiating more favorable investment fee arrangements with external advisors is largely a function of having access to industry fee data (i.e., knowing what the market rate should be for a given mandate), and assets of a size large enough to provide leverage in negotiations with external asset managers. While not all asset owners have large asset pools, this can be overcome by engaging an advisor that has scale to carry out fee negotiations since often the advisor’s clients will be treated as one pool by asset managers. We routinely perform fee benchmarking, tracking median investment fees by mandate type and portfolio size, and then use this information to negotiate the most competitive fee arrangements on behalf of our clients.

...insurers are still left with the task of generating adequate returns in a period of extraordinarily low fixed-income yields.
Advances in Investment Analytics

To enhance our benchmarking and optimization of investment managers, the Aon Center for Innovation and Analytics (based in Singapore) has developed sophisticated tools that allow for rapid benchmarking. Our InForm model looks not only at fees but also other items like the investment manager’s organization, staff, investment process, risk management, operations and terms & conditions. InForm enables rapid assessment, monitoring, and using peer-to-peer comparisons for rapid benchmarking. Our InForm model looks not only at the domicile but also at the investment manager’s staff, investment process, risk management, operations and terms & conditions. InForm Assessment to 30 Jun 2016 (Continued)

Producing returns on investments is a challenge facing all global insurers no matter the domicile.
Evolution of Capital Modeling

2016 has been a landmark year, both for the industry with the implementation of Solvency II, and also for Aon Benfield with the release of ReMetrica® version 7, our next generation capital modeling platform.

In January 2016 Solvency II came into force in Europe after a gestation period of almost 15 years replacing 14 EU insurance directives. Its progress has been closely monitored with elements adopted in other regulatory regimes. A key feature has been the ability of companies to use their own models to determine their capital and reporting requirements under the three pillar approach:

- **Pillar 1** consists of the financial requirements including the Solvency Capital Requirement (SCR) that can be calculated using either a standard factor-based formula or, with regulatory approval, an internal capital model

- **Pillar 2** details requirements for governance and supervision including Own Risk and Solvency Assessment (ORSA)—ORSA is required to be calculated separately from SCR and is more robust and company tailored to ensure all risks are captured

- **Pillar 3** focuses on reporting and disclosure requirements for increased transparency

For insurers that have chosen to build partial or full internal capital models, ORSA necessitates a longer term view of risk compared to the one-year time horizon of Pillar I; this ensures the total risk emerging in run-off is considered when making risk management decisions.

Solvency II is an example of regulation influencing the evolution and adoption of capital modeling. Another example is the Australian Prudential Regulation Authority’s (APRA’s) RBC framework (introduced in 2002), which was updated in 2013 and contained provision for internal models.

Capital modeling enhances a company’s ability to assess and test strategic decisions and risk management strategies to inform a company’s risk and capital strategy. These decisions may include for example, “do I have an optimal reinsurance program?”, “is this the best investment strategy?”, or “what is the capital impact if I buy this company?” Strategies are typically analyzed based on a Monte Carlo simulation that allows the model to capture complex risk interactions and interdependencies and provides insight into the range and likelihood of possible outcomes and their sensitivity to key variables. Reporting can be tailored to the company’s requirements detailing financial statements, key ratios, and other capital modeling metrics.

As global risk and complexity increases, boards, regulators, and rating agencies are more focused on risk than ever before. Ten years ago there were few companies taking such a technical approach, but an increased recognition that rating agency and regulatory capital models are not tailored to the individual company has driven many to invest in such modeling—actuaries to carry out the parameterizations and modeling, IT infrastructure leveraging technological improvements to run the calculations, and new processes to increase the company’s awareness of risk and capital implications. As one of our clients remarked, “Communication used to be one-way from other departments into the capital modeling team. Now it is two-way communication.”

Companies can get important capital relief from the process. One European reinsurer was able to demonstrate their actual capital requirements to their rating agency and obtained USD 450 million reduction in capital requirements. But beyond this, the information a company possesses is a key strategic asset and it is important for the appropriate modeling infrastructure to be in place to provide tangible insights that drive real business value. One major insurer used a capital model to help persuade their board to change their business strategy. This resulted in nearly USD 100 million returned to their shareholders and improved their net underwriting result by an average of 300 percent each year over the ensuing five years.

Aon Benfield works with companies to make the modeling process as smooth as possible to help make these decisions. Over the years we have extended the reach of ReMetrica with Enterprise Edition, support for parallel processing with Microsoft HPC, Cloud computing and this April we have released our next generation platform ReMetrica Version 7. This is designed to meet the industry needs for the next 10 years and help companies to make better decisions and better profits.
Insurance Relevance to the Economy

This chart compares property-casualty premium and GDP over the last 10 years for the top 50 countries. Globally, insurance has decreased in relevance with premiums being 2.0 percent of GDP today versus 2.2 percent a decade ago—driven particularly by significant drops across Europe. But we also see bright spots, most notably in China and India as well as Latin America.
Section 4

Data & Analytics
Along with risk and capital, data and analytics are the third force influencing the insurance market. Data and analytics provide the glue, the currency of risk, that brings together demand from risk bearers with supply from capital providers to make a functioning insurance market. The importance of this force in the insurance market is difficult to overstate.

The insurance industry was an early adopter of big data concepts and analytical methods in its use of credit scoring for personal lines and small commercial lines. Innovations in risk financing, from side cars, insurance-linked securities, and other forms of alternative capital today bear around one quarter of all global reinsured catastrophe risk. And the introduction of sophisticated catastrophe simulation models has had a profound impact, enabling today’s dynamic property catastrophe risk market. We have a track record of adopting and adapting to our changing environment.

From where we sit today, how can new data and analytics stimulate a new wave of innovation for the industry? One approach is to develop analytics to address risks that are underinsured or that present design challenges: risks such as cyber, damage to brand and reputation, and terrorism. We believe that these areas and others like them present significant growth opportunities for the insurance industry over the next 10 years, if data and analytics can solve the problems that currently exist with designing and pricing these products, underwriting, defining claims triggers, and overcoming adverse selection.

Predictive Data Streams

Another approach is to look for new innovations in well-established product lines. Beginning in 2015, Aon Benfield has set out to look for such innovations, beginning in the personal lines bedrock of homeowners and motor insurance. This research was done in conjunction with a pilot group of clients as well as a collection of data providers that capture data streams of household purchasing patterns and household economic characteristics.

Our objective has been to create scores with predictive power for these lines that are additive to existing pricing models, as measured by an improvement in loss ratio. The results of this approach allow us to produce an “overlay” that will allow insurance clients to adjust their current actions based on our scores and models. Potential use cases that we see include:

- **Pricing:** for example, we can create “red or neutral or green” flags for each policy, where “red” means “price +4%” and “green” means “price -4%” from whatever the insurer is currently pricing
- **Marketing:** focus on the “green” customers
- **Claims:** added scrutiny for “red” customers

The modeling was done using machine learning methods for maximum predictive power and speed of production. These methods were applied to a dataset consisting of 1.3 million policies collected from our pilot group, representing annual earned premiums of USD 670 million for homeowners insurance and USD 1.1 billion for motor insurance.

The results of this analysis appear in the charts on the facing page.

“Information is the oil of the 21st century, and analytics is the combustion engine.”

---

Gartner Research
In the case of motor, the best quartile based on the Aon scores showed loss ratios 22 percentage points (2200 basis points) better than the worst quartile. Similarly in homeowners, the best quartile outperformed the worst quartile by 13 loss ratio points (1300 basis points). Remember that the data analyzed here is insurers’ loss ratios relative to the premiums charged to customers, which incorporate insurers’ efforts to properly price each risk—so the differences between quartiles are due to variables not previously being used in pricing. These results suggest that insurance analytical methods can be meaningfully improved by incorporating new data streams.

Furthermore, unlike credit bureau-based scores or telematics-based driving data, these risk evaluations require neither “permissible purpose” under the Fair Credit Reporting Act or any current customer relationship.

These charts show the results averaged across multiple clients. Results for specific clients ranged from a 1000 basis point difference between best and worst quartile, up to a 2700 basis point difference between best and worst quartile. Catastrophe losses were excluded from homeowners results, and environmental variables were not used in the analysis, as they are already incorporated in most rating plans.

These results are promising, and also correspond well with intuition. For example, the analysis found that gamblers are worse than average risks, while gardeners are better than average risks.

Further tests with these datasets are ongoing. At Aon Benfield, we are excited to continue exploring these data streams with clients, and exploring ways to further improve on the methods of the past and advance the understanding of risk.

Insurance analytical methods can be meaningfully improved by incorporating new data streams.
Innovations in Claims Management

With approximately 60 to 70 cents of every premium dollar pointed at loss costs and associated expenses, when an insurer needs to improve financial results, claims is often the first place to consider. Insurers have typically focused on cutting internal expenses and vendor spend, as it is seemingly the easiest, fastest, and most quantifiable way to improve profitability. But the benefits of such expense reductions are often short-lived, and can result in unintended consequences such as increased indemnity that may far outweigh the expense reduction benefits—not to mention the potential for deterioration in customer experience, which will adversely affect retention rates.

Recent innovations in claims quality management and analytics are enabling insurers to improve claims outcomes and achieve sustainable 2 to 4% point improvement in loss ratio instead of pursuing short-term expense reductions. The Aon Inpoint team has outlined the following four “A’s” framework for claims: Assessment, Analytics, Actions, and Accountability. This framework enables insurers to measure and manage their claim handling processes and behaviors relative to industry best practices to improve claims outcomes.

1. Assessment
The starting point to identify and measure improvement opportunities is to assess the handling of critical claim outcome focused tasks, analysis, and decisions relative to industry best practices for a given line of business.

The key aspect of this review is quantifying the financial impact of each improvement opportunity (IO, also called claims leakage). IO is the minimum conservative estimate of the difference between what was paid on the claim versus what should have been paid. We assess IO at the “root cause” level.

Example: On a property claim, if coverage issues are not recognized, or coverage is not assessed and analyzed correctly, or loss is not scoped and estimated accurately, or potential third-party liability is not recognized or investigated properly, what is the potential overpayment?

Average insurers typically have IO of 6 to 12% as a percentage of paid loss and allocated loss adjustment expense (ALAE), depending on the line of business. Best-in-class insurers are at 2 to 3%.

<table>
<thead>
<tr>
<th>Line of Business</th>
<th>Average</th>
<th>Best-in-Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Physical Damage</td>
<td>6 to 8%</td>
<td>2%</td>
</tr>
<tr>
<td>Property</td>
<td>8 to 10%</td>
<td>2%</td>
</tr>
<tr>
<td>Liability</td>
<td>10 to 12%</td>
<td>3%</td>
</tr>
<tr>
<td>Workers’ Comp</td>
<td>9 to 11%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Moving from average to best-in-class can translate into a 2 to 4% point sustainable improvement in loss ratio. Conducting the assessment to establish a baseline is a critical starting point.
2. Analytics
Following an assessment comes analytics: dissecting the data gathered to gain insights on the improvement opportunities. One aspect of the analytic process is to understand the frequency and severity of issues. For example, paying for uncovered losses may be infrequent but costly when it happens. On the other hand, paying a few extra days on a car rental may happen frequently but have limited cost impact on a single claim, but significant impact over tens of thousands of claims.

Analytics also includes benchmarking your key metrics relative to average and top performers. In addition to IO, other metrics used by insurers include:

- **IO frequency**—the percentage of claims with an improvement opportunity
- **Average number of root causes per claim**—such as important task, analysis, and decision failures
- **Inpoint CPI™ (Claims Performance Index)**—a proprietary score on claim handling quality on scale of 0 to 300

Insights from these analytics enable insurers to determine the specific actions required to capture the opportunity.

3. Actions
After assessment and analytics, it’s time to take action. This can range from “quick win” tactical course corrections to longer term strategic transformation efforts. At times, clarifying or instituting best practices and focused training are adequate to capture the opportunities. Other times, insurers may need to take more drastic steps such as reorganizing the claims department, reengineering processes, investing in technology and transforming the culture.

Establishing a governance and program management structure to implement changes, track progress, and resolve any obstacles is essential, independent of the scale of the changes. In addition, an effective claims quality program and analytics platform is critical to drive changes and ensure continuous improvement.

4. Accountability
The final “A” for accountability is perhaps the most important to ensure successful and sustainable results. Companies drive accountability by incorporating key metrics into performance objectives for the claims department, and for individuals at various levels.

Accountability around claims quality and outcome must be balanced with accountability for customer service and operational efficiency. Customer satisfaction scores and productivity metrics at an individual and department level should also be part of the performance measures, and weighted appropriately.

Conclusion
This claims framework, when executed appropriately, has enabled many insurers to achieve better claims outcomes. And they have been able to achieve this while improving customer service and operational efficiency. Instead of reducing claims staff, these companies are actually investing in staff, developing their skills, improving their performance, and achieving higher engagement and loyalty.

---

Average insurers typically have claims leakage of 6 to 12%. Best-in-class insurers are at 2 to 3%.
According to an often-cited study from the Food and Agriculture Organization of the United Nations (FAO), the world’s population is expected to grow to 9.1 billion people by the year 2050, with the burden of feeding that burgeoning population set squarely on the shoulders of farmers across the globe. Recent estimates place the size of the world’s food and agribusiness industry at approximately USD 5 trillion, accounting for 10 percent of global consumer spending and 40 percent of employment. An influx of outside capital from private equity, hedge funds, and institutional investors has driven more than USD 100 billion in global investments into the sector since 2004 as it races to keep pace with demand. Within this expanding industry, the opportunities for insurance carriers and reinsurance capacity continue to grow across the supply chain from farm to table.
Markets, Established and Emerging
Well-established crop insurance markets like the US, Canada, and Europe have provided standard revenue and yield-based indemnity coverage to farmers for some time in addition to long-standing named-peril coverage (i.e. crop hail). Actuarial pricing of crop insurance products in these markets has been facilitated by strong record-keeping at both the farm and aggregate level by producers, insurance companies, and government institutions. In developed markets, penetration rates for agricultural insurance (measured as a percent of farmland under insurance) hover around 85 percent on average—a testament to the success of the program to provide a shared-cost safety net for the rural community.

In many developing markets including China and India, the absence of data for the purposes of ratemaking has made named-peril and index-based schemes more attractive to government sponsors as initial forays into crop insurance. Other markets including Latin America and Korea have offered multi-peril crop insurance despite difficulties in establishing an actuarially fair rate. While premium volumes continue to grow in these developing markets, penetration rates can still improve as the percentage of farmland insured is generally between 20 and 50 percent, showcasing the tremendous potential in these regions.

As satellite data and NDVI (Normalised Difference Vegetation Index) based imagery have shown new potential in claims efficiencies and loss forecasting applications, Aon Benfield’s Crop Reinsurance System (ACReS) has expanded to include yield forecasting and crop health assessment for markets including the US, Canada, China, and India. Furthermore, our risk expertise in underserved markets including livestock margin or mortality, forestry, aquaculture, and cost of production insurance allows Aon Benfield’s Global Agriculture team to leverage its capabilities on behalf of our clients looking to expand their offerings beyond standard crop insurance products.

Country Spotlight: India
Insurance penetration in India has been historically low and sometimes unpredictable. In 2014, of a total production area covering roughly 195 million hectares, only 43 million hectares were covered under the government sponsored crop insurance program—a low penetration rate of 22 percent.

This drove the current government to propose a new insurance program called Pradhan Mantri Fasal Bima Yojana (PMFBY) or Prime Minister’s Crop Insurance Scheme. The new scheme aims to increase the penetration rate to 50 percent of cropped land within the next three years through better insurance coverage and heavier government subsidies encouraging the voluntary sales to non-borrowing farmers. Targeted insurance education and capacity will also be necessary. PMFBY also moved the insurance product entirely to a risk-based premium regime supported by up-front subsidies in premium. As a result, the expected risk insured for 2016 to 2017 could potentially be USD 25.00 billion with a premium volume of well over USD 2.25 billion.

Under the existing crop insurance schemes, including the National Agriculture Insurance Scheme (NAIS, est 1999), the Weather Based Crop Insurance Scheme (WBCIS, est. 2007), and the Modified NAIS (MNAIS, est. 2009), the average sums-insured per hectare were often below the output value for the commodity, less than 50 percent of the value for many crops. The new scheme seeks to eliminate this coverage gap by removing any artificial capping of the premium rate and hence sums insured. Farmers contribution to these premiums will be capped at 2 percent for all Kharif (summer crops), 1.5 percent for Rabi (winter), and 5 percent for commercial or horticulture crops. The difference between the premium paid by the farmer and the actuarially charged rate is subsidized by the government.
Insurance companies currently approved to distribute and administer the program include the state-owned Agriculture Insurance Company of India, in addition to 11 companies from the private sector and recently the four state-owned general insurers. These four state-owned general insurers have been included as their extensive branch network should assist in the voluntary sales of this new product. Additional private insurers are also expected to be added to this list over time.

Aon Benfield is uniquely positioned to support insurers with risk transfer and analytics advisory services in the Indian marketplace with centers of expertise in Singapore, Mumbai, and Bangalore. ACReS capabilities are currently being used in the identification and placement of reinsurance solutions that help generate surplus relief or protect against earnings volatility and catastrophic loss via international reinsurance markets to meet carriers’ strategic risk and capital priorities. Aon Benfield is also investing in technical expertise in the region to support remote sensing projects designed to identify crop health, forecast portfolio losses, and drive efficiencies in claims handling for carriers. As crop insurance penetration increases across the country and empaneled insurance companies retool their internal processes to meet growing demand, Aon Benfield continues to offer differentiated value in analytics as a strategic partner.

### Indian Crop Insurance Schemes

<table>
<thead>
<tr>
<th>Years</th>
<th>WBCIS (INR Million)</th>
<th>MNAIS (INR Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Premium</td>
<td>Claims</td>
</tr>
<tr>
<td>2007-08</td>
<td>1,484</td>
<td>1,056</td>
</tr>
<tr>
<td>2008-09</td>
<td>817</td>
<td>495</td>
</tr>
<tr>
<td>2009-10</td>
<td>4,476</td>
<td>3,451</td>
</tr>
<tr>
<td>2010-11</td>
<td>12,894</td>
<td>6,346</td>
</tr>
<tr>
<td>2011-12</td>
<td>18,445</td>
<td>11,772</td>
</tr>
<tr>
<td>2012-13</td>
<td>22,242</td>
<td>19,339</td>
</tr>
<tr>
<td>2013-14</td>
<td>23,960</td>
<td>19,819</td>
</tr>
</tbody>
</table>
Bridging the Catastrophe Protection Gap

With record levels of capital in the (re)insurance industry, there is considerable focus on growth opportunities with discussion often focused on emerging risks and lines of business. However, there is also an opportunity for the industry to deploy capital to bridge the catastrophe protection gap. This section discusses:

- The protection gap by peril comparing historical economic and insured losses by peril
- Understanding the risk through the application of catastrophe modeling
- Financing the risk through the development of Disaster Risk Financing (DRF) strategies

The Protection Gap
The last four decades have seen increasing natural disaster losses around the world. Since 1980 alone, global catastrophes have led to more than USD 4.8 trillion (2016 USD) in economic cost to governments and the private sector. The annual rate of increase for these disasters is 4.0 percent above inflation, with some specific perils such as tropical cyclone (6.3 percent), severe convective storm (4.9 percent), and flood (4.5 percent) showing an even more pronounced rate of growth. Given these growth rates—and the continued development of the global economy and greater insurance penetration—it is unsurprising that insured losses have shown an even greater progression. The 7.3 percent annual rate of growth is driven by flood (16 percent), tropical cyclone (9 percent), and severe convective storm (7 percent) perils.

Despite insured losses growing at a healthy rate, the vast majority of global disaster losses remain uninsured. While catastrophes have caused USD 4.8 trillion in damage in the last 36 years, just USD 1.2 trillion (2016 USD)—or 25 percent—has been covered by public or private insurance entities. Of the roughly USD 1.2 trillion in insured losses, USD 740 billion—or 63 percent—of those losses were incurred in the US. This means that there remains a significant opportunity for the insurance industry to expand coverage in most of the world.

As expected, the economic-to-insured loss ratio is not uniform across the various regions of the globe. The greatest percentage of economic losses covered by insurance is found in the US, at 45 percent. EMEA is far behind at 23 percent, and is followed by the Americas (13 percent) and APAC (10 percent). This highlights that areas outside of the US remain particularly vulnerable from a financial perspective in the aftermath of a major catastrophe event.
When breaking down the global data on a by-peril basis, some striking results are determined. The perils with the highest percentage of insurance coverage are European windstorm (58 percent) and severe convective storm (56 percent). Other major perils such as tropical cyclone (33 percent), flood (12 percent) and earthquake (11 percent) are significantly lower. This is primarily due to a greater frequency of these types of events occurring in areas of the world—primarily Asia—with dense populations and highly exposed regions amid minimal coverage. Even in areas with greater overall insurance penetration there are specific perils in which significant gaps in coverage persist. In the US, for example, the flood peril remains largely uninsured for homeowners. Additionally, earthquake penetration in California has dwindled in recent years to just 10 percent.

All of these factors highlight the continued importance of catastrophe modeling to help analyze risk.

Understanding the Risk

Catastrophe models are indispensable tools for the insurance industry. While originally developed to quantify portfolio-level loss profiles for risk transfer, they are now widely used by product managers, pricing actuaries, and underwriters to support rate making and individual-risk underwriting. Using catastrophe models to align premium with risk is particularly valuable for companies seeking profitable growth opportunities with emerging perils such as flood.

The development of flood insurance products in Canada since the notable 2013 flooding in Alberta is a good example. Since this event, leading companies are utilizing Impact Forecasting’s probabilistic flood model for Canada to assist with identifying opportunities to provide new over-land flood coverage and to more accurately price commonly available sewer back-up endorsements.
Companies are under constant pressure to leverage internal knowledge and data assets to maintain profitability and support growth. Among these are claims data for US severe convective storm risk and the challenge of harnessing it to better align premium with loss experience. Leading companies, including American Strategic Insurance (ASI), are implementing detailed strategies to interrogate data to better understand their portfolio’s response to peril and its loss potential. As presented by ASI at the 2016 Impact Forecasting Revealed conferences in Bermuda and Miami, these efforts are greatly supported through the adoption of open platform catastrophe modeling and unique modeling tools designed for loss calibration. ELEMENTS, Impact Forecasting’s modeling software platform, is an example.

**Financing the Risk—Public Private Partnerships**

Given the impact of population growth, rapid urbanization, and high value risk concentrations increasing the protection gap, the economies of many countries are extremely vulnerable to major shocks due to catastrophic events. The risk burden falls heavily on the public sector forcing governments to provide post-disaster relief resulting in funding shortfalls, diversion of scarce budget resources, tax implications, and a reliance on post-disaster donor finance that is often inadequate, slow, and increasingly inefficient.

Many countries have responded with government schemes providing DRF for sectors of a country’s economy that may not be fully insured for catastrophic perils—sectors such as residential and commercial property, agriculture, government infrastructure, loss of government revenue, and disaster relief. The schemes are generally facilitated by Public Private Partnerships (PPP) where the private sector—such as local insurance and global reinsurance markets—provides the expertise to understand, underwrite, and manage the risk, and governments—supported in many cases by international and regional development banks—provide subsidies and incentives, seed funding, contingent capital, and the legal framework for the establishment of such schemes.

DRF aims to increase the resilience of vulnerable countries to the financial impact of disasters as part of a comprehensive approach to disaster risk management providing the following benefits to nations:

- **Increased commitment from governments**—government policy is important in driving risk mitigation through measures such as public education, early warning systems, and the enforcement of building codes.
- **Fast and effective post-disaster financial assistance**—this timely reconstruction and support creates economic gains. For example, reconstruction of infrastructure assets increases local economic activity and payouts from agricultural index insurance help low-income farmers.
- **Reduced economic costs of managing fiscal volatility**—risk transfer mechanisms avoid budget reallocation to operations and maintenance to finance reconstruction.

Risk financing approaches include risk retention—supported by funding, reserves, contingency budgets, and contingent credit—and risk transfer—through traditional (re)insurance and alternative risk transfer methods such as insurance-linked securities. While risk retention capacity meets the financial costs of low impact and high frequency events, risk transfer products are utilized to manage volatility of high impact and less frequent events, hence the increasing importance of cost-effective delivery of efficient risk transfer instruments.

To determine an optimal risk financing strategy, companies and governments must assess the potential impacts of catastrophic losses and likelihood of such losses. Catastrophe models play a fundamental role in this process. Importantly, limitations of the models must also be understood including the impact of non-modeled perils (e.g. flood, fire following earthquake, tsunami), extraneous impacts (e.g. post event inflation), and time-varying hazards (e.g. damaging earthquake aftershocks).

Aon Benfield offers a global perspective on the reinsurance market and the role of government schemes. It has assisted in the development and implementation of a number of national schemes and provides extensive modeling and risk management consulting services to ensure optimal risk financing strategies for many schemes.
Insurance underwriting is always a tradeoff between risk and return. The above chart compares property insurance growth—a key line of business in all countries—versus the volatility of underwriting results, as measured by the coefficient of variation.

For more of the analytics research that underpins this study, and detailed parameters to quantify insurance risk across the globe, please download the companion volume, “Global Risk, Profitability, and Growth Metrics” from the Aon Benfield Thought Leadership page, thoughtleadership.aonbenfield.com.
Section 5

Perspectives
Disruption: A Force to Increase Customer Value

What the insurance industry is calling “disruption” is not fundamentally about disruption; it is about creativity. The drive to create is a hallmark of Silicon Valley and all the innovation centers in the world today. Joshua Cooper Ramo, the co-CEO of Kissinger Associates, writes: “The most successful innovators and leaders of our era have a near-pathological desire to push and break old systems. They have faith that if they shove hard enough to snap one equilibrium a new one will emerge.”

Disruption in Context
Industries are remarkably robust and fragile at the same time. When you’re standing at any one point in time, industries look solid and unbreakable, but when you look closer, you see that industries get overturned all the time. It’s really a matter of perspective. And in practice, this fragility does not look like what you would expect.

Clay Christensen of Harvard Business School has spent his career studying disruptions in industries. Clay found that in industry after industry, the new technologies that overturned the established order were not necessarily better or more advanced than what the established players were offering. Studying the evolution of the disk drive industry, Clay found that the newest technology was always inferior in many ways to the then-current one. This is why incumbents miss it. He elaborates: “The new products were low-end, dumb, shoddy, and in almost every way inferior… but the new products were usually cheaper and easier to use.” Clay’s conclusion? The experts in incumbent companies are not necessarily the best positioned to see disruption coming.

Innovations in the Insurance Value Chain
We have assembled a database of 228 companies that are challenging the traditional insurance industry model in some way. Combined, the group has raised or attracted more than USD 48 billion of investment. The database includes companies at all stages of funding, from pre-series A to pre-IPO, and in all major geographies. This group is not just the typical, pure “FinTech” or “InsurTech” startup list; it includes 25 companies providing alternative capital as well as more established companies that are proving their distinctive business model through continued strong growth. We have not included any companies within the investment (management) link of the value chain since it is very small for property casualty and health insurers. Here is a high-level summary of the companies in the database.

Alternative capital providers dominate the financing. These are the hedge fund reinsurers and ILS funds that have emerged over the last decade. Because of the skew of the investments toward capital, we will focus on the characteristics of the remaining 203 non-capital companies. Regardless, it is important to remember the level and impact of alternative capital as an innovative force within insurance.

The 203 non-capital start up companies are split as follows: 73 percent broadly within the customer link; 22 percent within the paper link; and 5 percent within claims. Actual dollars of investment made, where known, follow a different distribution. Across the value chain, there is a more even split between customer and paper: 46 percent invested in customer related initiatives and 52 percent in paper related. The biggest individual investments recorded are Zhong An Insurance in China and Oscar Health Insurance in the US, both insurance companies in the paper link.

Insurance Startups Across the Value Chain

<table>
<thead>
<tr>
<th>Link in Value Chain</th>
<th>Number of Startups</th>
<th>Total Capital Raised (USD millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>148</td>
<td>2,245</td>
</tr>
<tr>
<td>Paper</td>
<td>45</td>
<td>2,550</td>
</tr>
<tr>
<td>Claim</td>
<td>10</td>
<td>103</td>
</tr>
<tr>
<td>Capital</td>
<td>25</td>
<td>43,710</td>
</tr>
<tr>
<td>Total</td>
<td>228</td>
<td>48,608</td>
</tr>
</tbody>
</table>
In order to make these insurance innovators more real, here are some examples of their quick-pitch narratives:

- A better insurance experience through education and a simpler buying process
- Comparison and shopping guides, e.g. tools to seek the lowest premiums among major insurers
- Online and mobile insurance marketplaces, end-to-end service and direct-to-consumer distribution
- Peer-to-peer insurance, built by pooling friends and trusted acquaintances to spread risk
- New coverages and products, e.g. on-demand, micro-duration insurance coverage
- Safety and telematics, e.g. monitoring commercial drivers’ alertness, giving drivers feedback

**Is Innovation Driving Growth?**
These pitches have common themes of rethinking the customer experience, distribution and risk sharing. Clearly the startup universe believes the traditional agent or broker relationship can be improved on, particularly for personal and small commercial lines. There is a theme of product complexity in need of being tamed.

From the incumbent vantage point, it is easy to see these new offerings as inferior—exactly the danger that Clay Christensen identified. The pitches seem to lack ambition as well as new “grow the pie” product ideas, to which we dedicated much of this study last year. It is hard to see how any of these ideas could have the scale needed to drive significant growth for the USD 1.4 trillion global property casualty insurance market.

If such moves will not grow the industry, what options do incumbents have? First, to join the disrupters—for more on this, see our next article, an interview with American Family’s Peter Gunder. Another option is for insurers to rethink their fundamental business—going beyond risk transfer, to risk advisory and risk management in general. Who is better suited to do this than insurers? But it does require a reevaluation of the expertise housed in an insurance organization, in addition to a creative consideration of nontraditional areas where that expertise can create value. Here are three examples:

- Allstate, which recently announced that it is creating a standalone unit for its telematics business to commercialize its growing expertise beyond the scope of current Allstate customers
- A medical professional liability provider that expanded beyond its core business of insuring private physicians to providing risk assessment and advisory services, and a library of resources to help physicians improve patient care and at the same time lower their liability risk
- A lender-placed homeowners insurer that has expanded its capabilities across the "mortgage value chain" to include title services, settlement services, and valuation for home equity loans.

As the traditional territory of insurers is opened up to startups and disruptors, it will be the insurers that think creatively (both within and outside their traditional silos) that see the greatest opportunity in the changing landscape of the value chain.
American Family Spotlight

Peter Gunder’s Views on Innovation Today

Innovation is an important topic of strategy for many multinational organizations, and insurance carriers are not exceptions. Today, the forces of innovation and disruption that confront the insurance industry are increasingly being driven by a host of entrepreneurial firms looking for opportunities to outperform incumbents at their own game; or more interestingly, at a new game.

Aon’s Global CEO of Analytics, Paul Mang, interviews American Family’s Chief Business Development Officer, Peter Gunder, on innovation in the insurance industry and how this US-based carrier is planning to win in this evolving, disruptive environment.

Q “Innovation” can mean a lot of things. What does “innovation” mean to you and at your organization?
At American Family, we define innovation as the capacity to develop products and services that fulfill the ever-evolving needs of the customer—that is the core of our approach. We are primarily a personal lines carrier, so we are very much focused on making sure our approach to innovation and product development lines up with a critical customer problem and delivers value over the long term.

Another way we define innovation within our organization is that it is the process by which we remove the constraints that once hindered us in serving customers—it is a means of breaking boundaries and diving into unchartered territory.

Q What are the key opportunities to innovate in our industry?
Distribution is clearly one area to focus on. I think the industry will be finding ways to distribute our existing products via novel, thoughtful, and clever methods. These new ways will complement our very strong agent network. A second area will be crafting new products that address evolving needs driven by trends like the sharing economy and demographic shifts, particularly in the US.

I would also say that because insurance is fundamentally a “digital product,” we should look for patterns of innovation from other industries that have high information content, such as high-tech and software. What can we learn from companies operating in these spaces?

Q What impresses you most about new ventures trying to disrupt insurance?
Like all successful start-ups, these new ventures entering our industry do a great job with rapid experimentation. They leverage technologies like cloud computing and the latest smartphone capabilities to really lower their cost of bringing concepts to life. I’m impressed by the speed at which they operate and their mindset of engaging customers early.

Q What are their weaknesses?
Disrupters need to have a complete set of capabilities to be successful—that is no easy feat to achieve. This isn’t necessarily a weakness, but the challenge of developing expertise in highly-technical insurance areas can be difficult. For instance, established players have experience in optimizing core insurance operations, especially labor-intensive processes, and a deep knowledge of regulatory affairs and compliance. It can be a challenge for new ventures to replicate those resources, so I expect to see more partnerships with established players.

In his book “The Third Wave,” Steve Case asserts that in this latest wave of technologies, linkages between startups and established players will be more prevalent. I believe we will see exactly that in insurance.
Q What is catching your attention these days in Silicon Valley?
I continue to be intrigued by IoT, the Internet of Things. I think it will have a significant impact on insurance in the future. For instance, AmFam has partnered with NEST—a producer of programmable, self-learning, sensor-driven, Wi-Fi-enabled thermostats, smoke detectors, and other security systems—to get involved with developments in connected-home technology. We think there will be clear benefits for our customers. For us, ubiquitous sensor technology allows us to think about how we as insurers can deliver “proactive protection.”

Another example of our interest in this type of sensor tech is our investment in Ring, a forward-facing video doorbell that lets a homeowner see and speak with visitors at the door, from anywhere. There is evidence that crime is reduced in neighborhoods where Ring has been deployed. We think something like this is good for our customers. It is promising enough that Kleiner Perkins and others invested USD 61.2 million into Ring as well.

Q Fascinating concept. Let’s turn to your organization—who’s responsible for innovation at your company?
It starts at the top; the CEO sets the innovation agenda and is the champion. In our case, Jack Salzwedel is a tremendous supporter and acts upon that support by funding our innovation activities. But to be really successful, we think everyone at our organization has to be responsible for innovation. The short answer to your question is that innovation is everyone’s job. I lead a small but dedicated team at AmFam that supports our entire organization to drive innovation.

Q You are the former Chief Investment Officer at AmFam—how does someone with your background think about metrics for your new role? For instance, how do you measure success for your corporate venture fund?
We all know that the VC asset class has a long established methodology to measure performance. We try to follow that methodology for our corporate venture capital activities. However, we have dual objectives for our investments in new technologies and new ventures. We have a strategic objective that involves learning about new ideas, such as connected-cars and IoT. I think of this as “strategic reconnaissance.” However, we have a financial objective as well in that we seek highly competitive financial returns for our fund. In this way, we have been able to attract the right talent to our team and to have access to the right investment opportunities out there.

About Peter Gunder
Peter Gunder is the Chief Business Development Officer at American Family. Since joining the firm in 2008, he has held several senior positions including Chief Investment Officer. Before joining American Family, Peter was co-founder and Managing Director of Cardinal Investment Advisors in Chicago. Peter earned a bachelor’s degree in mechanical engineering from Stanford University, later receiving an MBA in finance from the University of Chicago, Graduate School of Business.

About American Family
Peter Gunder leads American Family’s innovation efforts including a data science and analytics lab, and a corporate venture capital fund. The venture group is a small team that invest in seed through growth stage companies in sectors relevant to the future of insurance. Their initial investments typically range from $500K to $2M, and they aim to help create category-leading companies that can impact the insurance industry as a whole.
A member of the Fortune 500 listed companies, American Family is a private mutual organization that focuses on homeowners and auto insurance, as well as commercial insurance and life insurance products.
Global Insurance Market Opportunities

What a difference a decade makes. While property casualty insurance companies are busy addressing softening market conditions, low returns from investment portfolios, and changing customer expectations, it is easy to blame growth in expense ratios on recent events. However, financial results for 2016 are being affected by decisions made in the past and addressing the needs for the future of the business. When speaking with executives of US insurance companies, three common operational concerns arise at nearly every company:

- Addressing talent needs within the business
- Expense management
- Addressing efficiency through technology

While these issues are certainly not new, examining them more closely is helpful both for understanding past performance and managing future results.

Talent Needs

The profile of the typical insurance company’s employee population is notably different now than it was just 10 years ago. The business has moved significantly from clerical roles to a more technology driven organization with greater analytical and distribution needs. The three largest proportional staff increases over the last 10 years were in actuarial and analytics, information technology, and distribution roles.

Succession planning is no longer just a C-suite issue. The percentage of staff over the age of 50 has increased more than 15 percent over the past 10 years for the typical insurance company, with 11.4 percent of the employee population over 60 in 2016. The retirement eligible population often includes people with critical knowledge of systems, processes, and relationships that are difficult to replace—thus raising the importance of succession planning throughout the entire organization on a more proactive basis.

Expense Management Concerns

For the first time in several years, companies on a wider scale are seriously focusing on expense management. Why now? From 2011 to 2015, it was easier to grow premiums due to the hardening market conditions and growth in exposures as the economy improved. As a result of the premium growth, many companies had less focus on expenses. Instead, decisions were made that added significant expenses such as replacing core systems, growing staff, improving facilities, expanding market territories, and entering untested product lines. Expenses are now being realized for these projects, revenue is not growing as fast, and the expense ratio is increasing at greater than anticipated rates. Companies are now forced to make difficult choices including staff reductions, merger and acquisition considerations, and other major strategic decisions.

Staff Changes Relative to Premium Since 2005

Expense Management Concerns

For the first time in several years, companies on a wider scale are seriously focusing on expense management. Why now? From 2011 to 2015, it was easier to grow premiums due to the hardening market conditions and growth in exposures as the economy improved. As a result of the premium growth, many companies had less focus on expenses. Instead, decisions were made that added significant expenses such as replacing core systems, growing staff, improving facilities, expanding market territories, and entering untested product lines. Expenses are now being realized for these projects, revenue is not growing as fast, and the expense ratio is increasing at greater than anticipated rates. Companies are now forced to make difficult choices including staff reductions, merger and acquisition considerations, and other major strategic decisions.

Total Expenses as % of Net Premiums Written
It is notable to recognize the Ward’s 50 benchmark maintains a historical expense ratio that is 4 to 5 points better than industry average. The Ward’s 50 benchmark companies are defined as companies in the US that excel in profitability, growth, and stability. This benchmark group achieves a 6 to 7 points better combined ratio each year and the difference in the expense ratio contributes largely to that difference. The typical Ward’s 50 company operates with 16 percent fewer employees.

**Efficiency through Technology**
Technology expense for the average property-casualty company is nearly 4.5 percent of gross premium and 12 percent of the total operating expense budget. Although the expense relative to premiums is about the same as it was in 2000, substantial changes have taken place in IT departments over the last decade. The average IT department represents 22 percent more of overall company staff compared to 10 years ago, and external consulting has increased to 22 percent of the IT budget compared to only 11 percent in 1998.

Many companies struggle with achieving the most from their technology initiatives. Technology expenses have increased more than any other area over the past decade. But despite these investments, the average company has increased the policy count per employee by only 3.6 percent since 2010. The average number of claims per claims employee has stayed virtually flat.

Understanding why employee productivity has decreased even with major improvements in technology is not very difficult, and it is unfair to blame the IT department. In most cases the fault is equally shared with the business units for a variety of the following common reasons:

- Staff not reduced after project completion
- Revenue growth hid underlying performance problems
- Poor controls on scope and deliverables
- Too many ongoing projects
- Unrealistic expectations regarding what will be achieved
- Trying to meet every desire (rather than what is needed)
- Reliance or dependence on external vendors
- Too much modification of “off the shelf” solutions
- Resistance to change
- Workflow not redesigned with new technology

As insurers look to optimize their total expenses, they would be wise to consider IT expenses in this larger context before making a decision simply to cut back on technology investment.

**The Outlook**
Insurers are looking at innovation and making plans for future growth. Indeed, this study is encouraging it. But innovation cannot come at the expense of near-term results. Insurers need to earn the right to innovate by getting the basics right and achieving operational excellence. Staying focused on current performance, not losing sight of goals, and holding employees accountable for results need to remain top priorities. You cannot expect to build a successful plan for the future unless you understand where you have been. The companies that excel in these disciplines almost always emerge as winners.

“The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.”

Bill Gates
Conclusion

This year’s Global Insurance Marketing Opportunities report has given us a broad view of how the changing environment continues to create opportunities as well as add stress to the industry. The importance of risk management and efficient transfer of risk continues to increase, but the industry needs to adapt, as it always has in the past, to meet the challenge. We hope that a perspective on our industry that highlights the forces-at-work around Risk, Capital and Data & Analytics will enable your organization to have a productive leadership dialogue on strategy and tactics.

An important point of this dialogue should be how the organization responds to and interacts with potential new ventures (true startups) and potential entrants (from other sectors, such as Alibaba in China). We have argued that the most dangerous innovations can seem like inferior offerings from the incumbent’s point of view.

- **What are your criteria for pursuing a new business idea?**
- **Which of your processes are promoting or constraining innovation?**
- **Who owns innovation at your company? If it is to be “everyone,” how will individuals make the right trade-offs to pursue both near-term performance and longer-term innovative ideas concurrently?**

It will be the organizations that think creatively about the delicate balancing act of maintaining a performance culture while at the same time a disciplined innovation approach, that will see the greatest opportunity in our industry’s changing landscape.
Sources, Notes, and Contacts
Sources and Notes

**Increasing Customer-Centricity to Drive Innovation in Insurance, Page 4**
Sources:
American Customer Satisfaction Index, 2012 study, note this is the most recent year with all industries ranked; Axco Insurance Information Services

**Section 2: Risk**

**Risk Introduction, Page 12**
Sources:
URLs:

**Autonomous Vehicles: Implications for Insurance, Page 14**
Sources:
URLs:

**Cyber: Solutions to a Distributed Problem, Page 18**
Sources:
Advisen Cyber Front Page News, Aon Risk Solutions, McAfee, Global Council on Internet Governance; analytics by Aon Benfield Analytics
URLs:
Notes:
Global cyber premium estimates: Actual numbers through 2015 estimated by Aon Benfield; 2018 estimated by PwC; 2020 estimated by ABI Research.

**Brexit: The Road Ahead, Page 20**
Sources:
Aon Global Risk Management Survey 2015

**Takaful—Opportunities and Challenges, Page 22**
Sources:
Albilad Capital: Saudi Insurance Sector 2015; Bloomberg; Deloitte: The way forward for Takaful; Ernst & Young: Global Takaful Insights 2014; Ernst & Young: Malaysian Takaful Dynamics; Central Compendium 2015; The Jakarta Post: OJK speeds up Islamic REITs to attract Middle East investors; ISM Malaysia report: 2016 Market Performance (General Insurance & General Takaful)
URL:

**US Reserve Adequacy and the Link to the Underwriting Cycle, Page 23**
Sources:
SNL Financial; analysis by Aon Benfield Analytics

**Inside the Data—“Technology, Connectivity, and Cyber Risk”, Page 26**
Sources:
Cisco, CompTIA, Ericsson Mobility Report, Geohive, International Telecommunication Union, internetlivestats.com, United Nations Department of Economic and Social Affairs, World Bank
URLs:

Section 3: Capital

Capital & the Insurance Value Chain, Page 28
Sources:
Aon Benfield Reinsurance Market Outlook 2016; [same other sources as last year “Supply & Capital” article, plus] SNL Financial; analysis by Aon Benfield Analytics

Notes:
1. Weighted average cost of capital: calculation was based on the median debt and equity financing of 70 large publicly traded insurers, as they were combined to make each insurer’s WACC. We used total WACC for the public insurers, and the debt component only for the non-public insurers. Industry WACC is the weighted average of WACC across public and non-public insurers.
2. Insurance value chain analysis was performed off US Insurance Expense Exhibit (IEE) information from 2015 financial statements.

Mortgage: Capital Needs Creating New Growth, Page 30
Sources:
Aon Benfield, Fannie Mae, Freddie Mac

Opportunities in Investments, Page 32
Sources:
Aon InForm analysis, Bloomberg

Section 4: Data & Analytics

Data & Analytics, Page 38
Sources:
Aon Benfield, participating data providers and insurers; analysis by Aon Benfield Analytics

Innovations in Claims Management, Page 40
Sources:
Analysis by Aon Inpoint

Agricultural Risk Market: Opportunities for Growth, Page 42
Sources:
United Nations Food and Agriculture Organization, McKinsey, New Frontiers

Bridging the Catastrophe Protection Gap, Page 45
Sources:
Aon Benfield

Inside the Data—“Global Risk, Profitability, and Growth Metrics”, Page 48
Sources:

Section 5: Perspectives

Disruption: A Force to Increase Customer Value, Page 50
Sources:
Analysis by Aon Benfield Analytics and Aon Center for Innovation and Analytics, Singapore; Joshua Cooper Ramo, “The Seventh Sense,” published in 2016.

The Foundation of Innovation: Operational Excellence, Page 54
Sources:
Ward Group; analysis by Ward Group
Contacts

For more information on the Global Insurance Market Opportunities study or our analytic capabilities, please contact your local Aon Benfield broker or:

**Paul Mang**  
Global Chief Executive Officer of Analytics  
Aon Benfield  
+65 6812 6193  
paul.mang@aon.com

**Tracy Hatlestad**  
Global Chief Operating Officer of Analytics  
Aon Benfield  
+65 6512 0244  
tracy.hatlestad@aon.com

**Greg Heerde**  
Head of Analytics & Inpoint, Americas  
Aon Benfield  
+1 312 381 5364  
greg.heerde@aonbenfield.com

**George Attard**  
Head of Analytics, International  
Aon Benfield  
+65 6239 8739  
george.attard@aonbenfield.com

**John Moore**  
Chairman of International Analytics  
Aon Benfield  
+44 (0)20 7522 3973  
john.moore@aonbenfield.com

**Kelly Superczynski**  
Head of Analytics, EMEA  
Aon Benfield  
+1 312 381 5351  
kelly.superczynski@aonbenfield.com
Aon Benfield, a division of Aon plc (NYSE: AON), is the world's leading reinsurance intermediary and full-service capital advisor. We empower our clients to better understand, manage and transfer risk through innovative solutions and personalized access to all forms of global reinsurance capital across treaty, facultative and capital markets. As a trusted advocate, we deliver local reach to the world’s markets, an unparalleled investment in innovative analytics, including catastrophe management, actuarial and rating agency advisory. Through our professionals’ expertise and experience, we advise clients in making optimal capital choices that will empower results and improve operational effectiveness for their business. With more than 80 offices in 50 countries, our worldwide client base has access to the broadest portfolio of integrated capital solutions and services. To learn how Aon Benfield helps empower results, please visit aonbenfield.com.

About Aon Benfield

Aon Benfield, a division of Aon plc (NYSE: AON), is the world’s leading reinsurance intermediary and full-service capital advisor. We empower our clients to better understand, manage and transfer risk through innovative solutions and personalized access to all forms of global reinsurance capital across treaty, facultative and capital markets. As a trusted advocate, we deliver local reach to the world’s markets, an unparalleled investment in innovative analytics, including catastrophe management, actuarial and rating agency advisory. Through our professionals’ expertise and experience, we advise clients in making optimal capital choices that will empower results and improve operational effectiveness for their business. With more than 80 offices in 50 countries, our worldwide client base has access to the broadest portfolio of integrated capital solutions and services. To learn how Aon Benfield helps empower results, please visit aonbenfield.com.

© Aon Benfield Inc. 2016.
All rights reserved. This document is intended for general information purposes only and should not be construed as advice or opinions on any specific facts or circumstances. This analysis is based upon information from sources we consider to be reliable, however Aon Benfield Inc. does not warrant the accuracy of the data or calculations herein. The content of this document is made available on an “as is” basis, without warranty of any kind. Aon Benfield Inc. disclaims any legal liability to any person or organization for loss or damage caused by or resulting from any reliance placed on that content. Members of Aon Benfield Analytics will be pleased to consult on any specific situations and to provide further information regarding the matters.
About Aon
Aon plc (NYSE:AON) is a leading global provider of risk management, insurance brokerage and reinsurance brokerage, and human resources solutions and outsourcing services. Through its more than 72,000 colleagues worldwide, Aon unites to empower results for clients in over 120 countries via innovative risk and people solutions. For further information on our capabilities and to learn how we empower results for clients, please visit: http://aon.mediaroom.com.

© Aon plc 2016. All rights reserved.
The information contained herein and the statements expressed are of a general nature and are not intended to address the circumstances of any particular individual or entity. Although we endeavor to provide accurate and timely information and use sources we consider reliable, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

www.aon.com

GDM19760